PRACTICE EXAM 9: ADVANCED APPLICATION SIMULATION — 105 QUESTIONS

1. A leg of 130 nautical miles is flown at a groundspeed of 156 knots. What is the leg time?

A. 45 minutes

B. 50 minutes

C. 60 minutes

2. An airplane covers 84 nautical miles in 35 minutes. What is its groundspeed?

A. 120 knots

B. 130 knots

C. 144 knots

3. At a pressure altitude of 6,000 feet with a temperature of 28°C (standard 3°C), what is the approximate density altitude using 120 feet per degree?

A. 9,000 feet

B. 7,500 feet

C. 6,000 feet

4. A winds-aloft group reads "8165." What does it indicate?

A. Wind from 310° at 165 knots

B. Wind from 081° at 65 knots

C. Light and variable winds

5. A pilot computes a 40° crosswind from a 25-knot wind. What is the approximate crosswind component?

A. 19 knots

B. 25 knots

C. 16 knots

6. A non-instrument-rated commercial pilot is offered three flights: a 45-NM day passenger-for-hire, an 80-NM day passenger-for-hire, and a 30-NM night passenger-for-hire. Which is permissible?

A. The 80-NM day flight

B. The 45-NM day flight

C. The 30-NM night flight

7. A pilot loads an airplane to a total weight of 2,430 pounds with a total moment of 102,600 lb-in. What is the CG, and is it within a 35.0–47.3-inch envelope?

A. 38.0 inches, within limits

B. 42.22 inches, within limits

C. 48.0 inches, aft of limits

8. An airplane has 53 gallons usable and burns 10.6 gallons per hour. What is its endurance?

A. 4.5 hours

B. 5.5 hours

C. 5.0 hours

9. A pilot recognizes that a 45° bank in a level turn produces a load factor of about 1.41 G. By approximately what percentage does the stall speed increase?

A. About 41%

B. About 19%

C. About 5%

10. A pilot must reposition an unairworthy-but-safe airplane and also recognizes the pilot's commercial certificate does not authorize an air carrier operation. What is needed for the repositioning flight?

A. A special flight permit (ferry permit)

B. An air carrier certificate

C. A first-class medical

11. A field is at 5,500 feet with an altimeter setting of 28.92 in. Hg. What is the pressure altitude?

A. 4,500 feet

B. 6,500 feet

C. 5,500 feet

12. A pilot must determine the fuel for a 1-hour-45-minute flight at 9.6 gallons per hour. How much is used?

A. 14.4 gallons

B. 19.2 gallons

C. 16.8 gallons

13. A pilot encounters a vacuum failure in IMC and must continue partial-panel. Which instruments remain reliable?

A. The attitude indicator and heading indicator

B. The airspeed indicator, altimeter, VSI, turn coordinator, and magnetic compass

C. Only the magnetic compass

14. A winds-aloft group reads "3450." What wind does it represent?

A. Wind from 340° at 50 knots

B. Wind from 034° at 50 knots

C. Wind from 340° at 150 knots

15. A pilot must determine the headwind component for a 25-knot wind at 40° off the runway. What is it?

A. 16 knots

B. 19 knots

C. 25 knots

16. A pilot flying a constant-speed-propeller airplane sets a high manifold pressure with a low RPM beyond the POH limits during a hot climb and notices detonation. What is the correct combined response?

A. Continue, since the setting is within limits

B. Increase RPM further only

C. Reduce manifold pressure, increase RPM, and enrich the mixture to address detonation

17. A pilot must determine which AIRMET covers IFR ceilings and mountain obscuration while planning a mountainous route in low visibility. Which is correct?

A. AIRMET Tango

B. AIRMET Zulu

C. AIRMET Sierra

18. A pilot computes a CG of 42.22 inches and must verify it against forward and aft limits of 41.0 and 47.3 inches. What is the conclusion?

A. The CG is within limits

B. The CG is forward of the limit

C. The CG is aft of the limit

19. A pilot must determine the time to climb 7,500 feet at a rate of 600 feet per minute. How long?

A. 10.0 minutes

B. 12.5 minutes

C. 15.0 minutes

20. A pilot recognizes that exceeding maneuvering speed (VA) in turbulence risks structural damage, and that VA decreases with weight. While lightly loaded in turbulence, what should the pilot do?

A. Slow to a lower maneuvering speed than when heavy

B. Maintain cruise speed, since VA is irrelevant when light

C. Increase speed to penetrate the turbulence faster

21. A pilot must report an accident involving substantial damage and determine the written-report deadline. Which is correct?

A. A written report within 30 days

B. No report is required for substantial damage

C. Immediate notification to the NTSB and a written report within 10 days

22. A pilot computes that an airplane covers 2.3 nautical miles per minute. What is the approximate groundspeed?

A. 138 knots

B. 120 knots

C. 150 knots

23. A pilot flying at night without an instrument rating is asked to carry a passenger for hire 30 NM. What governs the decision?

A. The flight is permitted, since it is under 50 NM

B. The flight is prohibited, since the limitation also bars night passenger-for-hire

C. The flight is permitted with a second-class medical

24. A pilot must determine the privileges of a commercial certificate when the medical lapses to third class. Which is correct?

A. All commercial privileges remain

B. Only private privileges may be exercised until the second-class medical is renewed

C. No privileges of any kind may be exercised

25. A pilot recognizes structural icing conditions (visible moisture at −2°C) and an AIRMET Zulu while flying an airplane without anti-ice. What two-part action is correct?

A. Continue and descend after ice accumulates

B. Increase airspeed to shed the ice

C. Exit the icing conditions, since both the conditions and the AIRMET confirm the hazard

26. A pilot must determine the standard temperature at 6,000 feet using 15°C at sea level and 2°C per 1,000 feet. What is it?

A. +3°C

B. +5°C

C. +7°C

27. A pilot loads baggage that places the CG aft of the limit though total weight is acceptable. What is the correct action and reason?

A. Accept, since total weight is within limits

B. Add nose weight beyond approved provisions

C. Rearrange or remove the load, since an aft CG beyond the limit degrades stall/spin recovery

28. A pilot must determine the correct sequence to reduce power on a constant-speed propeller while descending. Which is correct?

A. Reduce the propeller control first, then the throttle

B. Reduce the mixture first

C. Reduce the throttle (manifold pressure) first, then the propeller control

29. A pilot recognizes that the wing stalls at the critical angle of attack regardless of airspeed and must apply this in a high-speed steep turn. What is correct?

A. The wing cannot stall at high airspeed

B. The wing can stall in the steep turn if the critical angle is exceeded

C. Stall speed is fixed regardless of load factor

30. A pilot must determine the VFR weather minimums at 12,000 feet MSL in Class E airspace. Which is correct?

A. 5 SM visibility with 1,000/1,000/1-SM cloud clearance

B. 3 SM visibility with 500/1,000/2,000 cloud clearance

C. Clear of clouds with 1 SM visibility

31. A pilot must determine the right action when a required instrument is inoperative and the airplane has an approved MEL. Which is correct?

A. Follow the MEL provisions to determine if the flight may proceed

B. Always ground the airplane regardless of the MEL

C. Placard and depart without consulting the MEL

32. A pilot computes a weight shift to move the CG forward by 1.5 inches in a 2,200-pound airplane over a 96-inch distance. How much weight must be shifted?

A. 50 pounds

B. 28 pounds

C. 34 pounds

33. A pilot recognizes the danger of a microburst on approach and the shifting wind it produces. What is the correct understanding?

A. A microburst produces a steady, predictable headwind

B. A microburst produces an initial headwind, then a severe downdraft and tailwind

C. A microburst produces only a crosswind

34. A pilot must determine the oxygen requirement for a 45-minute exposure at a cabin altitude of 13,500 feet. Which is correct?

A. No oxygen is required

B. Oxygen is required only above 15,000 feet

C. The crew must use oxygen for the time exceeding 30 minutes

35. A pilot encounters reverse sensing on the VOR while diverting under time pressure and must correct it. What is the correct action?

A. Set the OBS to match the direction of flight

B. Replace the receiver in flight

C. Navigate by the magnetic compass alone

36. A pilot must determine the ceiling from "SCT015 BKN025 OVC045" and decide on a VFR approach. What is the ceiling?

A. 4,500 feet AGL

B. 1,500 feet AGL

C. 2,500 feet AGL

37. A pilot recognizes that a forward CG raises stall speed and reduces elevator authority while loading near the forward limit. What is the correct understanding?

A. A forward CG lowers stall speed and eases the flare

B. A forward CG raises stall speed and may make the flare harder

C. A forward CG has no effect on the flare

38. A pilot must decide whether to penetrate a line of mature thunderstorms or reroute, recognizing the mature-stage hazards. What is correct?

A. Penetrate quickly to minimize exposure

B. Reroute, since the mature stage has the greatest turbulence and hazards

C. Fly beneath the storms to stay below the turbulence

39. A pilot loses two-way communication at night near a towered airport with position lights on. What two-part procedure applies?

A. Squawk 7600, watch for light gun signals, and maintain position lights

B. Squawk 7700 and land on any runway

C. Squawk 1200 and continue without signals

40. A pilot must determine the effect of high humidity on a hot, high-density-altitude takeoff. What is correct?

A. Humid air improves performance

B. Humidity has no effect

C. Humid air is less dense, raising density altitude and degrading performance

41. A pilot recognizes get-there-itis while low on fuel near a destination reporting a thunderstorm. What is the correct decision?

A. Acknowledge the bias, divert to refuel, and avoid the storm

B. Continue and land quickly before the fuel runs out

C. Speed up to beat the storm

42. 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 (12 months) and a 100-hour inspection

C. Only a 100-hour inspection

43. A pilot computes that leaning is needed at altitude while the engine runs rough full-rich, and connects it to the thinner air. What is correct?

A. The mixture is too lean; enrich it

B. The thinner air makes the mixture too rich; lean it

C. The magnetos failed; land immediately

44. A pilot recognizes the antidote "Not so fast; think first" while tempted to react abruptly to a gust on final. Which hazardous attitude is it?

A. Impulsivity

B. Macho

C. Resignation

45. A pilot must determine the right of way when overtaking a slower aircraft near an airport. What is correct?

A. The overtaking aircraft has priority and passes left

B. The faster aircraft always has priority

C. The overtaken aircraft has the right of way; the overtaking aircraft passes to the right

46. A pilot must determine the cloud clearance in Class C airspace while planning a flight crossing Class B. Which is correct?

A. Both require clear of clouds

B. Both require 1,000/1,000/1 SM

C. Class C requires 500/1,000/2,000; Class B requires clear of clouds

47. A pilot computes that best glide speed near L/Dmax provides maximum gliding distance after an engine failure. What is the correct first action?

A. Establish best glide speed immediately

B. Establish maneuvering speed

C. Attempt a restart before establishing glide

48. A pilot must determine the effect of a tailwind on landing distance at a high-density-altitude airport. What is correct?

A. The tailwind decreases the landing distance

B. The tailwind increases the landing distance, compounding the density-altitude penalty

C. The tailwind has no effect

49. A pilot recognizes that a spin requires a stalled wing and yaw, and must recover from an uncoordinated stall. What procedure applies?

A. The PARE procedure (power idle, ailerons neutral, rudder opposite, elevator forward)

B. Add aft elevator and hold the bank

C. Apply full power and full aileron into the spin

49b placeholder. (skip)

50. A pilot must determine the documents required aboard and which must be displayed for a for-hire flight. Which is correct?

A. Only the registration, displayed to passengers

B. The pilot's logbook, displayed

C. The ARROW documents, with the airworthiness certificate displayed

51. A pilot recognizes that VLO and VLE govern different gear operations while operating at high speed. 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

52. A pilot must determine the right action for an active prohibited area on course while confirming the VOR is current for IFR. Which is correct?

A. Request a clearance to transit, and the VOR check is every 90 days

B. Reroute around the prohibited area, and the VOR check is required within 30 days

C. Descend beneath the area, and the VOR check is every 12 months

53. A pilot recognizes that carbon monoxide from a cracked exhaust causes hypemic hypoxia through the cabin heater. What is the correct action?

A. Increase the cabin heat to mask the symptoms

B. Shut off the cabin heat, ventilate, and land as soon as practical

C. Continue and monitor the symptoms

54. A pilot must determine the minimum safe altitude over a congested area while conducting aerial photography. Which is correct?

A. 1,000 feet above the highest obstacle within a 2,000-foot radius

B. 500 feet above the surface

C. 200 feet above the highest obstacle

55. A pilot recognizes that the temperature/dewpoint spread is narrowing toward saturation at the destination near dusk. What should the pilot anticipate?

A. Improving visibility and clear skies

B. Strong gusty winds

C. Possible fog formation lowering visibility

56. A pilot must determine the privileges limitation that bars a non-instrument-rated commercial pilot from a 70-NM daytime passenger-for-hire flight. Which is correct?

A. The flight is prohibited, since it exceeds the 50-NM limit

B. The flight is permitted, since the limitation applies only at night

C. The flight is permitted regardless of distance

57. A pilot recognizes that the mature thunderstorm stage has both updrafts and downdrafts while on approach. What is the correct understanding?

A. The cumulus stage is the most dangerous

B. The mature stage has the greatest turbulence and hazards

C. The dissipating stage has the strongest updrafts

58. A pilot must determine the standard pressure and temperature at sea level while computing pressure altitude. Which is correct?

A. 29.92 in. Hg and 15°C

B. 30.00 in. Hg and 20°C

C. 28.92 in. Hg and 0°C

59. A pilot recognizes a vacuum failure in IMC and must avoid trusting the failing attitude indicator. What is the correct technique?

A. Continue trusting the attitude indicator

B. Close the eyes until the sensation passes

C. Cross-check the remaining instruments using partial-panel technique

60. A pilot must determine the IFR fuel reserve to a destination requiring an alternate. Which is correct?

A. 30 minutes beyond the destination only

B. 45 minutes beyond the destination with no alternate fuel

C. Enough to reach the destination, then the alternate, plus 45 minutes

61. A pilot recognizes that a constant-speed propeller separates manifold pressure from RPM while configuring for a high-density-altitude takeoff. Which is correct?

A. The mixture controls RPM

B. The throttle controls manifold pressure and the propeller control sets RPM

C. The flaps control manifold pressure

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

A. The glider has the right of way over the airplane

B. The airplane has priority over the glider

C. They share equal priority

63. A pilot recognizes that the heading indicator precesses and must be reset to the compass during a cross-country. What is correct?

A. It senses the magnetic field directly and never drifts

B. It is gyroscopic and precesses, requiring resetting to the compass

C. It is a pitot-static instrument affected by altitude

64. A pilot must determine the squawk code for lost communications while also recalling the emergency code. Which pairing is correct?

A. 7700 for lost comms, 7600 for emergency

B. 7600 for lost comms, 7700 for emergency

C. 1200 for lost comms, 7500 for emergency

65. A pilot recognizes that an aft CG improves cruise efficiency but degrades recovery while loading near the aft limit. What is the correct understanding?

A. An aft CG is more efficient but less stable and harder to recover

B. An aft CG is more stable and easier to recover

C. An aft CG has no effect on recovery

66. A pilot must determine the cloud clearance at 12,000 feet MSL in Class E. Which is correct?

A. 500 below, 1,000 above, 2,000 horizontal

B. Clear of clouds

C. 1,000 below, 1,000 above, 1 SM horizontal

67. A pilot recognizes that wingtip vortices are strongest behind a heavy, clean, slow aircraft and must avoid them when departing behind a large jet. What is correct?

A. Rotate before the jet's rotation point and climb above its path

B. Rotate after the jet's rotation point and stay below its path

C. Delay exactly 30 seconds regardless of wind

68. A pilot must determine the effect of an altimeter setting of 28.92 in. Hg (below standard) on pressure altitude relative to field elevation. Which is correct?

A. Pressure altitude is lower than field elevation

B. Pressure altitude is higher than field elevation

C. Pressure altitude equals field elevation

69. A pilot recognizes the danger of relying solely on the airspeed indicator to avoid a stall in a steep turn. What is correct?

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 with bank

70. 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"

71. A pilot recognizes that holding out to the public for hire confirms common carriage while evaluating a job. What is correct?

A. A commercial certificate authorizes the flight

B. The flight is permitted if under 50 NM

C. The flight is common carriage requiring an air carrier certificate

72. A pilot must determine the standard traffic pattern altitude and direction at a non-towered airport. Which is correct?

A. Left turns (unless indicated) at 1,000 feet AGL, announced on the CTAF

B. Right turns at 500 feet AGL on center frequency

C. Straight-in only with no announcements

73. A pilot recognizes that detonation is abnormal explosive combustion aggravated by high power and temperature. What is the correct response?

A. Continue, since detonation is normal

B. Reduce power and enrich the mixture

C. Increase manifold pressure further

74. A pilot must determine the minimum medical class for commercial for-hire privileges. Which is correct?

A. At least a second-class medical

B. A third-class medical

C. A first-class medical only

75. A pilot recognizes that a microburst on approach near a thunderstorm is deadly. What is the correct action?

A. Land quickly before it intensifies

B. Continue and add aft elevator

C. Avoid the area and delay or divert until the hazard passes

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

A. Up to 10 hours, with the excess included in the next interval

B. Up to 25 hours, with the excess forgiven

C. Up to 10 hours, with the interval restarting at zero

77. A pilot recognizes spatial disorientation in clouds with the attitude indicator working normally. What is the correct technique?

A. Trust bodily sensations over the instruments

B. Trust and fly the flight instruments

C. Make large control inputs to regain feel

78. A pilot must determine the effect of a forward CG on stability and stall speed while loading near the forward limit. Which is correct?

A. Increased stability and higher stall speed

B. Decreased stability and lower stall speed

C. No effect on either

79. A pilot recognizes that the magnetos are independent of the electrical system after a total electrical failure. What happens to the engine?

A. It stops immediately

B. It loses half its power

C. It continues running

80. A pilot must determine the VFR transponder code when not assigned a discrete code while recalling the hijack code. Which pairing is correct?

A. 7500 for VFR, 1200 for hijack

B. 7700 for VFR, 7600 for hijack

C. 1200 for VFR, 7500 for hijack

81. A pilot recognizes that the first lost-procedure step is to climb while disoriented over rising terrain. Why climb?

A. To descend below the clouds

B. To improve reception, range, and terrain clearance

C. To read ground features more closely

82. A pilot must determine the cloud clearance for Class B while planning a flight crossing Class E below 10,000 feet. Which is correct?

A. Both require 1,000/1,000/1 SM

B. Both require clear of clouds

C. Class B requires clear of clouds; Class E below 10,000 requires 500/1,000/2,000

83. A pilot recognizes that a 60° bank produces a 2 G load factor and a 41% stall-speed increase. What is the correct understanding?

A. Load factor depends only on bank angle in a level turn

B. Load factor depends on airspeed, not bank

C. Bank angle does not affect load factor

84. A pilot must determine the right of way for an aircraft in distress while avoiding a nearby thunderstorm. Which is correct?

A. The distress aircraft yields to all others

B. The distress aircraft shares priority with gliders

C. The distress aircraft has priority over all, and the storm must be avoided by 20 NM

85. A pilot recognizes that structural icing requires visible moisture and a temperature of 0°C or colder while flying without anti-ice. What is correct?

A. Icing requires only visible moisture

B. Icing requires both visible moisture and 0°C or colder; avoid those conditions

C. Icing requires a temperature above 10°C

86. A pilot must determine the effect of leaning the mixture as altitude increases. Which is correct?

A. It increases manifold pressure

B. It restores the proper fuel-air ratio in thinner air

C. It cools the cylinders rapidly

87. A pilot recognizes that the gear warning horn sounds when the throttle is retarded with the gear up. What is the correct action?

A. Verify the gear is down and locked (three green) and complete the GUMPS check

B. Retract the flaps

C. Enrich the mixture

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

A. 18 years old and 250 hours

B. 16 years old and 150 hours

C. 21 years old and 300 hours

89. A pilot recognizes that an outlook briefing suits a departure seven hours away. What is correct?

A. A standard briefing is required this far out

B. An abbreviated briefing is required

C. An outlook briefing is appropriate for a departure six or more hours away

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

A. The altimeter reads increasing altitude normally

B. The altimeter freezes at the altitude where the blockage occurred

C. The altimeter reads decreasing altitude

91. A pilot recognizes that an aircraft for hire requires both an annual and a 100-hour inspection. What is correct?

A. Only the annual is required

B. The 100-hour satisfies the annual

C. Both the annual (12 months) and the 100-hour (for hire) are required

92. A pilot must determine the right action when the static source blocks in IMC without an alternate static source. Which is correct?

A. Break the glass of the VSI to use cabin pressure as a last resort

B. Switch magnetos to clear the blockage

C. Increase RPM to restore static pressure

93. A pilot recognizes that best glide speed should be established immediately after an engine failure, then a site selected. What is correct?

A. Establish best glide to maximize distance, then select a site within glide range

B. Establish maneuvering speed and descend rapidly

C. Attempt a restart before establishing glide

94. A pilot must determine the standard atmospheric lapse rate while estimating temperature at altitude. Which is correct?

A. About 5°C per 1,000 feet

B. About 2°C per 1,000 feet

C. About 1°C per 10,000 feet

95. A pilot recognizes that a temperature inversion produces wind shear at its top and traps reduced visibility below. What is correct?

A. The inversion produces severe icing within the layer

B. The inversion produces wind shear at its top and reduced visibility below

C. The inversion produces engine power loss at the boundary

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

A. The airplane has priority

B. They share equal priority

C. The balloon, being least maneuverable, has the right of way

97. A pilot recognizes that VX gives the most altitude over the shortest distance while clearing an obstacle on a constant-speed-propeller takeoff. What is the correct combined action?

A. Set high RPM/low blade angle and climb at VX

B. Set low RPM and climb at VY

C. Climb at maneuvering speed

98. A pilot must determine the documents excluded from the domestic requirement. Which is excluded?

A. The airworthiness certificate

B. The operating limitations

C. The radio station license

99. A pilot recognizes that holding out, transporting persons for hire point-to-point, confirms common carriage. What is the correct understanding?

A. It is permitted with a commercial certificate

B. It requires an air carrier certificate under Part 119

C. It is exempt if under 50 NM

100. A pilot must determine the effect of a forward CG on cruise efficiency and the flare. Which is correct?

A. A forward CG improves cruise efficiency and eases the flare

B. A forward CG raises fuel consumption slightly and can make the flare harder

C. A forward CG has no effect

101. A pilot recognizes that the wing always stalls at the critical angle of attack regardless of airspeed. What is the correct application in a steep turn?

A. The wing cannot stall at high airspeed

B. Stall speed is fixed in all turns

C. The wing can stall in the steep turn if the critical angle is exceeded

102. A pilot must determine the required crew oxygen above 14,000 feet cabin altitude. Which is correct?

A. The crew must use oxygen the entire time

B. Oxygen is required only above 15,000 feet

C. No oxygen is required

103. A pilot recognizes that a special flight permit is needed to ferry an unairworthy-but-safe airplane to maintenance. What is correct?

A. A special flight permit (ferry permit) is required

B. A second-class medical alone authorizes it

C. A flight review authorizes it

104. A pilot must determine the minimum visibility for VFR in Class B airspace. Which is correct?

A. 5 statute miles

B. 3 statute miles

C. 1 statute mile

105. A pilot recognizes the readiness standard for the CAX while reviewing simulation scores. Which is correct?

A. A 70% score guarantees a short checkride

B. Any passing score signals readiness

C. Consistently scoring 85% or higher indicates readiness with headroom

Exam 9 Answer Key with Full Answer Explanations

1. B — Time equals distance divided by groundspeed: 130 ÷ 156 = 0.833 hour = 50 minutes. At 156 knots the airplane covers 130 NM in 50 minutes. The relationship gives the leg time.

2. C — Groundspeed equals distance divided by time: 84 ÷ (35 ÷ 60) = 84 ÷ 0.583 = 144 knots. The relationship solves for speed. It is the inverse of the time computation.

3. A — Density altitude equals pressure altitude plus the deviation times 120 feet: 6,000 + (28 − 3) × 120 = 6,000 + 3,000 = 9,000 feet. The 25°C above standard adds 3,000 feet. High temperature raises density altitude sharply.

4. A — Because the coded direction "81" exceeds 36, the special encoding applies: subtract 50 (81 − 50 = 31 → 310°) and add 100 to speed (65 + 100 = 165 knots). The result is 310° at 165 knots. This signals winds over 100 knots.

5. C — The crosswind component equals wind speed times the sine of the angle: 25 × sin(40°) = 25 × 0.643 ≈ 16 knots. The headwind component would be about 19 knots. The crosswind is about 16 knots.

6. B — The 45-NM day passenger-for-hire flight is permissible; the 80-NM flight exceeds the 50-NM limit and the 30-NM night flight violates the night limitation for a non-instrument-rated pilot. Only the under-50-NM daytime flight is allowed. The limitation governs both distance and night.

7. B — CG equals total moment divided by total weight: 102,600 ÷ 2,430 = 42.22 inches, which falls within the 35.0–47.3-inch envelope. The CG is in limits. Both weight and CG must be confirmed.

8. C — Endurance equals usable fuel divided by burn rate: 53 ÷ 10.6 = 5.0 hours. This is the basic endurance relationship. It determines flight duration.

9. B — Stall speed increases with the square root of the load factor; at 1.41 G that is $\sqrt{1.41} \approx 1.19$, an increase of about 19%. A 60° bank (2 G) would give 41%. The 45° bank yields about a 19% increase.

10. A — A special flight permit (ferry permit) is needed to reposition an unairworthy-but-safe airplane; the commercial certificate does not authorize an air carrier operation, and one is not required here. A first-class medical is not the issue. The ferry permit addresses the repositioning.

11. B — With the altimeter 1.00 in. Hg below standard and about 1,000 feet per inch, pressure altitude is 1,000 feet above the 5,500-foot field: 6,500 feet. A setting below 29.92 raises pressure altitude. The relationship is inverse to the setting.

12. C — Fuel equals rate times time: 9.6 × 1.75 = 16.8 gallons (1 hour 45 minutes = 1.75 hours). The fuel-burn relationship gives the answer. It is straightforward multiplication.

13. B — In a vacuum failure, the pitot-static instruments (airspeed, altimeter, VSI), the electrically driven turn coordinator, and the magnetic compass remain reliable. The attitude and heading indicators are vacuum-driven and fail. Partial-panel flying uses the remaining instruments.

14. A — "3450" decodes to wind from 340° at 50 knots; the direction (34 → 340°) is under 37 and the speed under 100, so no special encoding applies. The decode gives 340° at 50 knots. It reads directly.

15. B — The headwind component equals wind speed times the cosine of the angle: 25 × cos(40°) = 25 × 0.766 ≈ 19 knots. The crosswind component would be about 16 knots. The headwind is about 19 knots.

16. C — Detonation from an oversquare, over-limit setting on a hot climb is addressed by reducing manifold pressure, increasing RPM, and enriching the mixture. Continuing or increasing RPM alone does not resolve it. Reducing power and enriching addresses detonation.

17. C — AIRMET Sierra covers IFR ceilings and mountain obscuration. Tango covers turbulence and wind, and Zulu covers icing. Sierra matches the mountainous low-visibility hazard.

18. A — A CG of 42.22 inches falls between the forward limit of 41.0 and the aft limit of 47.3 inches, so it is within limits. It is neither forward nor aft of the limits. The loading is acceptable for CG.

19. B — Time to climb equals altitude gain divided by climb rate: 7,500 ÷ 600 = 12.5 minutes. The relationship gives the climb time. It is a simple division.

20. A — Because VA decreases with weight, a lightly loaded airplane in turbulence should slow to a lower maneuvering speed than when heavy. Maintaining cruise speed or speeding up risks overstress. The lower VA when light is the counterintuitive point.

21. C — An accident involving substantial damage requires immediate notification to the NTSB and a written report within 10 days. A 30-day report or no report is incorrect. Immediate notification plus a 10-day written report applies.

22. A — At 2.3 nautical miles per minute, the groundspeed is 2.3 × 60 = 138 knots. The relationship converts NM/min to knots. It supports quick navigation estimates.

23. B — A 30-NM night passenger-for-hire flight is prohibited for a non-instrument-rated commercial pilot, because the limitation bars night passenger-for-hire regardless of distance. The under-50-NM allowance applies to daytime distance, not night. The night limitation governs.

24. B — With the medical lapsed to third class, only private privileges may be exercised until the second-class medical is renewed. Commercial privileges are suspended, but the certificate is not lost. Renewing the second-class medical restores commercial privileges.

25. C — The pilot should exit the icing conditions, since both the visible moisture at −2°C and the AIRMET Zulu confirm the structural-icing hazard for an airplane without anti-ice. Continuing or increasing airspeed does not reliably shed ice. Both factors confirm the danger.

26. A — Standard temperature at 6,000 feet is 15 − (2 × 6) = 15 − 12 = +3°C. The standard lapse rate is the basis. It is used to judge nonstandard deviations.

27. C — An aft CG beyond the limit must be corrected by rearranging or removing the load, because it degrades stall and spin recovery. Acceptable total weight does not make an out-of-limits CG safe, and adding unapproved nose weight is not the answer. The aft-CG recovery hazard governs.

28. C — To reduce power on a constant-speed propeller, reduce the throttle (manifold pressure) first, then the propeller control, following the rule to decrease MP first. Reducing the propeller control or mixture first is wrong. The sequence protects the engine.

29. B — The wing can stall in a high-speed steep turn if the critical angle of attack is exceeded, because the increased load factor raises the actual stall speed. High airspeed does not prevent a stall, and stall speed is not fixed. Angle of attack governs the stall.

30. A — Class E airspace at 12,000 feet MSL (at or above 10,000) requires 5 SM visibility with 1,000/1,000/1-SM cloud clearance. The 3 SM/152 set applies below 10,000. The larger minimums apply at 12,000.

31. A — With an approved MEL, the pilot follows the MEL provisions to determine whether the flight may proceed with the inoperative item. The airplane is not automatically grounded, and the MEL must be consulted. The MEL governs when one exists.

32. C — Weight to shift equals (CG change × total weight) ÷ distance: (1.5 × 2,200) ÷ 96 = 3,300 ÷ 96 ≈ 34 pounds. This rearranges the weight-shift formula. About 34 pounds moves the CG 1.5 inches.

33. B — A microburst produces an initial headwind, then 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.

34. C — At a cabin altitude of 13,500 feet (between 12,500 and 14,000) for 45 minutes, the crew must use oxygen for the time exceeding 30 minutes. No oxygen, or oxygen only above 15,000 feet, is incorrect. The 30-minute trigger governs.

35. A — Reverse sensing is corrected by setting the OBS to match the direction of flight, so the CDI senses correctly. Replacing the receiver or navigating by compass alone is not the fix. Matching the OBS resolves reverse sensing.

36. C — The ceiling is the lowest broken or overcast layer; SCT015 is scattered (not a ceiling), so the lowest broken layer BKN025 sets the ceiling at 2,500 feet. The OVC045 layer is higher. The ceiling is 2,500 feet AGL.

37. B — A forward CG raises stall speed and reduces elevator authority, which may make the flare harder. It does not lower stall speed or ease the flare. The forward-CG effects are the explanation.

38. B — The pilot should reroute, since the mature stage has the greatest turbulence and hazards. Penetrating or flying beneath the storms is dangerous. The mature-stage hazards demand avoidance.

39. A — Lost comms at night near a towered airport calls for squawking 7600, watching for light gun signals, and maintaining position lights. Squawking 7700 or 1200 is wrong. The lost-comm procedure governs.

40. C — Humid air is less dense than dry air, raising density altitude and degrading performance on a hot, high takeoff. It does not improve performance or have no effect. Humidity worsens density altitude.

41. A — The pilot should acknowledge the get-there-itis bias, divert to refuel, and avoid the storm. Continuing to land quickly or speeding up lets the bias drive an unsafe outcome. Both the fuel and storm hazards call for diverting.

42. 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 to for-hire/instruction use.

43. B — The thinner air at altitude makes the full-rich mixture too rich, so leaning restores the proper ratio. The mixture is not too lean, and the magnetos have not failed. Leaning corrects the over-rich condition.

44. A — "Not so fast; think first" is the antidote to impulsivity, the tendency to react abruptly. It does not counter macho or resignation. The antidote slows the impulsive reaction.

45. C — The overtaken aircraft has the right of way; the overtaking aircraft passes to the right. The overtaking aircraft does not have priority or pass left, and speed does not determine priority. "Pass right" is the rule.

46. C — Class C requires 500/1,000/2,000 cloud clearance, while Class B requires clear of clouds. They are not both clear-of-clouds or both 1,000/1,000/1 SM. Each class has its own requirement.

47. A — Best glide speed, near L/Dmax, should be established immediately after an engine failure to maximize gliding distance. Maneuvering speed or a restart attempt before establishing glide is wrong. Best glide first maximizes reachable sites.

48. B — A tailwind increases landing distance, compounding the high-density-altitude penalty, because the airplane touches down at a higher groundspeed. It does not decrease the distance or have no effect. Both effects lengthen the landing roll.

49. A — A spin requires a stalled wing and yaw; recovery uses the PARE procedure (power idle, ailerons neutral, rudder opposite, elevator forward). Adding aft elevator or applying aileron into the spin worsens it. PARE is the standard recovery.

50. C — The ARROW documents are required aboard, with the airworthiness certificate displayed. Only the registration, or the logbook, is not the answer. The document set and display requirement combine.

51. 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.

52. B — A prohibited area on course must be avoided by rerouting, and the VOR check is required within 30 days for IFR. A clearance to transit, or a 90-day/12-month VOR check, is wrong. Both requirements combine.

53. B — CO from a cracked exhaust feeding the cabin heater calls for shutting off the heat, ventilating, and landing as soon as practical. Increasing heat or continuing worsens the exposure. Removing the source is the priority.

54. A — Over a congested area, the minimum safe altitude is 1,000 feet above the highest obstacle within a 2,000-foot radius. The 500-foot and 200-foot figures are incorrect for congested areas. Section 91.119 governs.

55. C — A narrowing temperature/dewpoint spread toward saturation at dusk signals possible fog lowering visibility. It does not indicate improving visibility or strong winds. A narrowing spread favors fog.

56. A — A 70-NM daytime passenger-for-hire flight is prohibited, since it exceeds the 50-NM limit for a non-instrument-rated commercial pilot. The limitation applies to over-50-NM as well as night. The distance limit bars the flight.

57. B — The mature stage has both updrafts and downdrafts and the greatest turbulence and hazards. The cumulus stage is building, and the dissipating stage is weakening. The mature stage is the most dangerous.

58. A — Standard sea-level conditions are 29.92 in. Hg and 15°C. The other values are incorrect. These anchor pressure-altitude computation.

59. C — A vacuum failure in IMC requires cross-checking the remaining instruments using partial-panel technique. Continuing to trust the failing attitude indicator or closing the eyes is dangerous. Partial-panel cross-checking maintains control.

60. C — 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.

61. B — On a constant-speed propeller airplane, the throttle controls manifold pressure and the propeller control sets RPM. The mixture and flaps do not control these. The two power controls define the complex airplane.

62. 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.

63. B — 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.

64. B — Squawk 7600 for lost communications and 7700 for an emergency. The reversed or 1200/7500 pairing is wrong. The two codes are distinct.

65. A — An aft CG is more efficient but less stable and harder to recover from a stall or spin. It is not more stable or without effect on recovery. The aft-CG recovery hazard is the key point.

66. C — Class E airspace at 12,000 feet MSL (at or above 10,000) requires 1,000 below, 1,000 above, 1 SM horizontal cloud clearance. The 500/1,000/2,000 set applies below 10,000, and clear-of-clouds applies to Class B. The larger clearance applies at 12,000.

67. A — Departing behind a heavy jet, rotate before its rotation point and climb above its path to avoid the sinking vortices. Rotating after its point or staying below enters the wake. Staying above is the avoidance principle.

68. B — With the altimeter at 28.92 in. Hg (1 inch below standard), pressure altitude is higher than field elevation, because lower pressure corresponds to higher pressure altitude. A setting above 29.92 lowers it. The relationship is inverse to the setting.

69. 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.

70. 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.

71. C — A flight that holds out to the public for hire is common carriage requiring 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.

72. A — The standard pattern uses left turns (unless indicated) at 1,000 feet AGL, announced on the CTAF at a non-towered airport. Right turns at 500 feet on center frequency, or straight-in with no calls, are wrong. The standard pattern and CTAF combine.

73. B — Detonation, abnormal explosive combustion aggravated by high power and temperature, is addressed by reducing power and enriching the mixture. Continuing or increasing manifold pressure worsens it. Reducing power and enriching is the response.

74. A — At least a second-class medical is required for commercial for-hire privileges. Third class supports only private privileges, and first class is the ATP standard. Second class is the commercial minimum.

75. C — A microburst on approach near a thunderstorm calls for avoiding the area and delaying or diverting until the hazard passes. Landing quickly or adding aft elevator is dangerous in the wind shear. Avoidance is the only defense.

76. A — The 100-hour inspection may be exceeded by up to 10 hours to reach a maintenance facility, 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.

77. B — Spatial disorientation in clouds, even with a working attitude indicator, is overcome by trusting and flying the flight instruments. Bodily sensations and large inputs lead to loss of control. Instrument trust is the defense.

78. A — A forward CG increases stability and raises stall speed, because more tail-down force is needed. It does not decrease stability or lower stall speed. Forward CG is more stable but less efficient.

79. C — A total electrical failure does not stop the engine, because the magnetos are independent and self-energizing. The engine continues running; only electrical systems are lost. Magneto independence explains it.

80. C — The VFR code when not assigned a discrete code is 1200, and the hijack code is 7500. The reversed or 7700-for-VFR pairing is wrong. The two codes are distinct.

81. B — The first lost-procedure step is to climb to improve reception, range, and terrain clearance. Descending or reading ground features narrows the options. Climbing extends the airplane's reach and clearance.

82. C — Class B requires clear of clouds, while Class E below 10,000 feet requires 500/1,000/2,000 cloud clearance. They are not both 1,000/1,000/1 SM or both clear-of-clouds. Each class has its own requirement.

83. A — Load factor in a level turn depends only on bank angle, so a 60° bank always produces 2 G and a 41% stall-speed increase regardless of airspeed or weight. It does not depend on airspeed. Bank angle determines the level-turn load factor.

84. C — An aircraft in distress has priority over all others, and the thunderstorm must be avoided by 20 NM. The distress aircraft does not yield or share priority. Both the right-of-way and avoidance points combine.

85. B — Structural icing requires both visible moisture and a temperature of 0°C or colder, so the pilot should avoid those conditions without anti-ice. Visible moisture alone, or temperatures above 10°C, do not produce structural ice. Both conditions must be present.

86. B — Leaning the mixture as altitude increases restores the proper fuel-air ratio in the thinner air. It does not increase manifold pressure or rapidly cool the cylinders as its purpose. Leaning corrects the over-rich condition at altitude.

87. A — The gear warning horn sounding with the throttle retarded and the gear up calls for verifying three green and completing the GUMPS check. It is not a flap or mixture warning. The horn prompts a gear verification.

88. A — 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. C — An outlook briefing is appropriate for a departure six or more hours away, so a seven-hour-out departure fits. A standard or abbreviated briefing does not match this timing. The six-hour threshold defines the outlook briefing.

90. B — 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.

91. C — A for-hire aircraft requires both the annual (every 12 months) and the 100-hour inspections. The annual alone is insufficient, and a 100-hour does not satisfy the annual. Both inspections apply.

92. A — In an airplane without an alternate static source, breaking the glass of the VSI provides cabin pressure as a last resort. Switching magnetos or increasing RPM does nothing for a blocked static port. The VSI glass is the last-resort static source.

93. A — Best glide speed should be established immediately after an engine failure to maximize distance, then a site selected within glide range. Maneuvering speed or a restart attempt before establishing glide is wrong. Best glide first, then site selection.

94. B — The standard temperature lapse rate is about 2°C per 1,000 feet. The 5°C and 1°C-per-10,000-feet figures are incorrect. The standard lapse rate anchors temperature estimates.

95. B — A temperature inversion produces wind shear at its top and traps reduced visibility below. It does not cause severe icing within the layer or engine power loss at the boundary. The shear and reduced visibility are the hazards.

96. C — 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. A — To clear an obstacle on a constant-speed-propeller takeoff, set high RPM/low blade angle and climb at VX, which gives the most altitude over the shortest distance. Low RPM/VY or maneuvering speed is wrong. VX and the takeoff propeller setting combine.

98. C — The radio station license is excluded from the domestic requirement; it is needed only for international operations. The airworthiness certificate and operating limitations are required domestically. The radio license is the excluded item.

99. C — Holding out, transporting persons for hire point-to-point, requires an air carrier certificate under Part 119. A commercial certificate alone is insufficient, and there is no under-50-NM exemption. Holding out completes the common-carriage test.

100. B — A forward CG raises fuel consumption slightly (from increased tail-down force and drag) and can make the flare harder. It does not improve cruise efficiency or have no effect. The forward-CG effects are the explanation.

101. C — The wing can stall in a steep turn if the critical angle of attack is exceeded, because the load factor raises the actual stall speed. High airspeed does not prevent a stall, and stall speed is not fixed. Angle of attack governs the stall.

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

103. A — A special flight permit (ferry permit) is required to ferry an unairworthy-but-safe airplane to maintenance. A medical or flight review does not authorize the flight. The ferry permit addresses this situation.

104. B — VFR flight in Class B airspace requires a minimum visibility of 3 statute miles (and clear of clouds). The 5 SM and 1 SM figures are incorrect for Class B. The 3 SM/clear-of-clouds combination applies.

105. C — 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 readiness. The 85% benchmark is the readiness standard.