

PRACTICE EXAM 6 — FULL 125-QUESTION SIMULATION

1. A first officer is hand-flying a swept-wing jet through FL310 in light icing. As the aircraft accelerates in the climb, the captain reminds the FO that the wing produces less low-speed lift than a straight wing. This reduced low-speed lift is a direct consequence of sweep, which the crew accepts as a trade for:

- A. a lower stall speed in the landing configuration
- B. reduced structural weight at the wing root
- C. a higher critical Mach number and faster cruise
- D. eliminating the need for a yaw damper

2. During the takeoff roll, the captain calls "V1" and, two seconds later, the right engine fails with a loud bang and yaw. The aircraft is past V1. The captain continues the takeoff. The most immediate handling task is to:

- A. retract the flaps to reduce the asymmetric drag
- B. apply rudder to control the yaw toward the dead engine
- C. reduce thrust on the left engine to ease the swing
- D. lower the nose well below the horizon to gain speed

3. A dispatcher and crew compute the load: total weight 175,000 lb, total moment 112,000,000 in-lb. The CG aft of the datum is:

- A. 600 inches
- B. 615 inches
- C. 660 inches
- D. 640 inches

4. A crew at cruise loses the right engine at FL400 over high terrain. After setting maximum continuous thrust on the left engine, the captain slows to L/D MAX and begins a driftdown. The reason for slowing to L/D MAX is to:

- A. minimize the descent rate and level off as high as possible
- B. reach the destination on schedule despite the failure
- C. accelerate the descent to clear the terrain rapidly
- D. maintain the cruise altitude on the single engine

5. A crew planning a heavy takeoff finds the second-segment climb gradient is limiting their weight. The first officer asks why the second segment is so critical. The captain explains it is flown at V_2 with takeoff flaps from gear-up to at least 400 feet and requires a minimum gradient of:

- A. 1.2 percent for a two-engine transport
- B. 3.0 percent for a two-engine transport
- C. 2.4 percent for a two-engine transport
- D. a positive gradient only

6. A jet climbing toward its maximum operating altitude enters light turbulence, and the captain notes the margin between the low-speed and high-speed buffet is shrinking. As the aircraft nears the coffin corner, a steep turn would be especially dangerous because increasing load factor:

- A. raises the stall speed, narrowing the already small margin
- B. lowers the critical Mach number below cruise speed
- C. reduces the maximum cabin differential pressure
- D. automatically disconnects the autothrottle system

7. A crew exceeds critical Mach in a descent, and the aircraft begins to pitch nose-down, accelerating further. The captain recognizes Mach tuck and reduces speed. The reason the nose-down tendency is self-reinforcing is that:

- A. the yaw damper applies increasing corrective rudder
- B. the wing loses all lift as the shock wave forms
- C. the engines spool up automatically at high Mach
- D. the increasing speed strengthens the shock and shifts lift further aft

8. A crew preparing for departure reviews the dispatch release, which both the captain and dispatcher have agreed to. Just before pushback, the dispatcher calls with a new forecast showing the destination dropping below minimums, and recommends adding fuel and an alternate. Under shared operational control:

- A. the captain may depart as planned because authority shifts at the gate
- B. the release must be amended and re-agreed before the flight may depart
- C. the dispatcher's recommendation is advisory only and may be ignored
- D. the chief pilot must approve any change to the release

9. A crew is deciding whether a destination alternate is required. The forecast for the ± 1 -hour window around the ETA shows a 2,500-foot ceiling and 4 statute miles visibility. Applying the 1-2-3 rule, the crew determines:

- A. an alternate is required because visibility is below 5 miles
- B. an alternate is required because the ceiling is marginal
- C. no alternate is required, since both thresholds are met
- D. two alternates must be listed for redundancy

10. A pilot reviewing weight limits explains to a new first officer that fuselage payload increases wing-bending stress while wing fuel relieves it. The structural limit that caps non-fuel weight before any fuel is loaded is the:

- A. maximum takeoff weight
- B. maximum landing weight
- C. maximum ramp weight

D. maximum zero fuel weight

11. A crew in icing conditions selects wing and engine anti-ice, which draws hot bleed air. The captain reminds the FO to expect, as a consequence of the bleed-air demand:

- A. an increase in available climb thrust
- B. automatic deployment of the ram air turbine
- C. reduced bleed for pressurization and a slight thrust reduction
- D. a complete loss of cabin pressurization

12. During cruise, a transport suffers a total loss of all engine-driven generators. The crew completes the checklist and flies on standby instruments while the essential buses remain powered by:

- A. the air conditioning packs and recirculation fans
- B. the battery and the ram air turbine generator
- C. the engine-driven hydraulic pumps directly
- D. the transformer rectifier units alone

13. A crew decoding a METAR reads "BKN004 OVC012." On their approach, the captain identifies the ceiling as:

- A. 1,200 feet, the overcast layer
- B. unlimited, because broken layers are not ceilings
- C. the average of the two layers, 800 feet
- D. 400 feet, the lowest broken layer

14. A crew briefing for a flight near a strong jet stream reviews the forecast for clear air turbulence. The captain notes CAT will not appear on the weather radar and asks the FO why. The correct reason is that weather radar:

- A. detects precipitation, not the clear-air wind shear that causes CAT
- B. is automatically inhibited above FL300
- C. only scans below the aircraft's flight level
- D. cannot operate in the cold air near the tropopause

15. A crew on final encounters a microburst: the airspeed jumps and the aircraft balloons above the glidepath. The captain, anticipating the reversal, applies maximum thrust. Reducing power in response to the initial airspeed gain would be dangerous because moments later the crew will face:

- A. a sinking tailwind that leaves the aircraft low and slow
- B. a steady crosswind requiring rudder only
- C. continued smooth air through the approach
- D. an updraft carrying the aircraft well above the path

16. A crew encounters freezing rain while descending into the destination. The captain identifies this as the most hazardous icing condition because freezing rain produces rapid clear ice and indicates:

- A. that the icing conditions have ended below
- B. a layer of warmer air aloft
- C. an absence of supercooled droplets
- D. temperatures well below -20°C throughout

17. A flight crew unexpectedly enters a cloud of volcanic ash at cruise. The engine indications fluctuate. The correct immediate response is to:

- A. climb above the ash using maximum thrust
- B. activate the weather radar to navigate around it
- C. reduce thrust and exit the cloud, typically with a 180° turn
- D. continue straight ahead to clear the cloud faster

18. A crew reviewing a TAF sees "TEMPO 0608 5SM BR." The captain explains that "TEMPO" indicates conditions that are:

- A. a rapid, complete change beginning at 0600Z
- B. temporary fluctuations expected between 0600Z and 0800Z
- C. a gradual change over the entire forecast period
- D. a 40 percent probability of the stated conditions

19. A crew at the MDA on a non-precision approach does not have the runway environment in sight by the missed approach point. The correct action is to:

- A. execute the missed approach procedure
- B. descend 100 feet below the MDA to look for the runway
- C. continue descending to the runway threshold
- D. circle below the MDA until the runway appears

20. A crew flying an RNP approach receives a navigation alert indicating the system can no longer meet the required accuracy. The captain notes this self-monitoring capability is exactly what distinguishes RNP from basic RNAV, namely:

- A. the ability to fly curved paths between waypoints
- B. the use of ground-based VOR stations
- C. on-board performance monitoring and alerting
- D. a lower required accuracy in all phases of flight

21. A crew computing the maximum flight duty period notes their report time is 0300 with five scheduled segments. The captain correctly anticipates this combination will yield:

- A. the longest allowable FDP, due to light early traffic
- B. an FDP unaffected by report time

- C. a moderate FDP based on segment count alone
- D. one of the shortest FDPs, due to the circadian low and many segments

22. A crew suffers a loss of pressurization at FL370. The captain immediately dons the oxygen mask and establishes communication before doing anything else. This sequence is dictated by the fact that, at that altitude, the time of useful consciousness is:

- A. several minutes, allowing time to troubleshoot
- B. 20 to 30 minutes, as at lower altitudes
- C. extended by lowering the cabin temperature
- D. only seconds, demanding immediate oxygen

23. A crew stalls the aircraft at high altitude during a turbulence encounter. The captain recovers by lowering the nose to reduce the angle of attack, accepting altitude loss. The reason thrust alone cannot break the stall at altitude is that:

- A. the thin air provides little excess thrust
- B. the engines are limited to idle above FL300
- C. the autothrottle inhibits thrust during a stall
- D. high thrust would shift the CG dangerously aft

24. A jet cruises at a true airspeed of 500 knots where the local speed of sound is 595 knots. Its Mach number is approximately:

- A. 0.74
- B. 0.79
- C. 0.84
- D. 0.90

25. A crew encountering a windshear escape situation near the ground applies maximum thrust. The captain reminds the FO that during the escape they must NOT:

- A. follow the flight-director or stick-shaker pitch
- B. change the configuration by moving the gear or flaps
- C. add energy to climb away from the shear
- D. maintain wings-level flight as much as possible

26. A crew detects an engine fire warning shortly after takeoff, past V1. After continuing the takeoff and completing the memory items, the captain's plan is to:

- A. continue to the originally scheduled destination
- B. climb to cruise and complete all paperwork first
- C. hold near the airport until the warning extinguishes
- D. land as soon as possible at a suitable airport

27. A pilot reviewing high-altitude meteorology explains that the tropopause is aviation-critical because it is where the jet stream and the most severe CAT are found, and where temperature stops falling at approximately:

- A. 0°C near 18,000 feet
- B. -56.5°C near 36,000 feet
- C. -15°C near 25,000 feet
- D. -40°C near 30,000 feet

28. A crew on an ILS approach reaches the published decision altitude with the runway environment in sight and the aircraft in a position to land. At the DA, the crew:

- A. continues the approach and lands
- B. levels off and holds until further visual cues appear

- C. descends an additional 100 feet to confirm
- D. executes the missed approach regardless

29. A pilot reviewing the relationship between density altitude and takeoff performance at a hot, high-elevation airport explains that high density altitude degrades performance because the less-dense air:

- A. increases the wing's coefficient of lift at rotation
- B. raises the available engine thrust
- C. reduces both engine thrust and aerodynamic performance
- D. lowers the true airspeed required to become airborne

30. A crew reviewing the standard hold knows that at FL220 the inbound leg timing is 1.5 minutes, because the altitude is:

- A. above 14,000 feet
- B. below the transition altitude
- C. within Class A airspace
- D. above the service ceiling

31. A crew dispatching a domestic Part 121 flight that requires an alternate computes fuel to reach the destination, then the most distant alternate, and then:

- A. hold 45 minutes before proceeding to the alternate
- B. 45 minutes at normal cruise consumption
- C. 30 minutes at holding speed
- D. 90 minutes at best-glide speed

32. A pilot reviewing the certificate framework explains that to act as PIC of a Part 121 air carrier flight, a pilot must hold an ATP certificate and:

- A. a second-class medical certificate
- B. a commercial certificate as a backup
- C. an ATP-CTP graduation certificate alone
- D. a first-class medical certificate

33. A crew reviewing the MEL finds an inoperative item listed as deferrable. The captain confirms it is placarded, the procedures are complete, and:

- A. the FAA has been notified of the deferral
- B. the item has been physically removed from the aircraft
- C. any specified conditions and limitations are observed
- D. a special flight permit has been obtained

34. A pilot reviewing aeromedical factors explains that the insidious danger of hypoxia is that it:

- A. always produces obvious physical distress first
- B. impairs judgment before the victim recognizes it
- C. affects only pilots over the age of 50
- D. is immediately reversible without supplemental oxygen

35. A crew encountering a thunderstorm cell understands that hail and severe turbulence may be encountered:

- A. only within the visible precipitation core
- B. only above the anvil at the storm top
- C. exclusively during the dissipating stage
- D. in clear air beneath and beside the storm

36. A pilot reviewing approach minimums explains that a Minimum Descent Altitude (MDA) is used on approaches that provide:

- A. both lateral and vertical guidance to a decision point
- B. satellite-based precision vertical guidance
- C. lateral guidance only, with no electronic glideslope
- D. automatic landing capability to the surface

37. A pilot reviewing the lift equation explains that as an aircraft climbs and air density falls, to maintain the same lift the wing must:

- A. fly at a higher true airspeed for a given indicated airspeed
- B. reduce its true airspeed proportionally
- C. mechanically increase its wing area
- D. reduce its angle of attack to zero

38. A crew reviewing the RVSM airspace they will enter understands it provides 1,000-foot vertical separation between:

- A. the surface and FL180
- B. FL180 and FL290
- C. FL290 and FL410
- D. FL410 and FL600

39. A pilot reviewing the hazardous attitudes recognizes that a crewmember thinking "I must act right now" is exhibiting:

- A. anti-authority, countered by "follow the rules"
- B. impulsivity, countered by "not so fast; think first"
- C. macho, countered by "taking chances is foolish"

D. resignation, countered by "I can make a difference"

40. A pilot reviewing the engine-out climb explains that maximum continuous thrust is significant because it is the:

- A. highest thrust permitted for unlimited duration
- B. time-limited maximum used only for takeoff
- C. idle thrust setting used during descent
- D. thrust automatically reduced by the autothrottle

41. A crew reviewing the pilot monitoring role understands that the PM's primary duty is to:

- A. monitor the flight path and automation and speak up on deviations
- B. manipulate the flight controls during the approach
- C. set takeoff thrust without cross-checking the flying pilot
- D. assume control whenever the autopilot is engaged

42. A pilot reviewing weather references explains that winds in a winds-and-temperatures-aloft forecast are referenced to true north, while surface winds reported by a control tower are referenced to:

- A. the runway centerline heading
- B. the aircraft's gyrocompass
- C. grid north at all latitudes
- D. magnetic north

43. A crew encountering severe icing beyond the aircraft's certification envelope should:

- A. continue at the planned altitude with anti-ice on
- B. slow below the stall warning to shed the ice

- C. exit the icing conditions as soon as possible
- D. increase the angle of attack to keep the wing clear

44. Using a surface temperature of $+15^{\circ}\text{C}$ and the standard lapse rate of 2°C per 1,000 feet, the approximate temperature at FL350 (35,000 feet) is:

- A. -25°C
- B. -35°C
- C. -45°C
- D. -55°C

45. A pilot reviewing pressurization control explains that cabin pressure is regulated primarily by the:

- A. inflow rate of bleed air from the packs
- B. outflow valve metering air leaving the cabin
- C. engine compressor bleed pressure at the source
- D. emergency ram-air ventilation door position

46. A crew reviewing the certificate pathways notes that a qualifying graduate of an approved two-year aviation degree program may be issued a Restricted ATP at:

- A. 1,000 hours
- B. 1,500 hours
- C. 750 hours
- D. 1,250 hours

47. A pilot reviewing icing protection explains that pitot tubes and static ports are protected from ice by:

- A. electrical heating elements

- B. hot bleed air from the engine compressors
- C. pneumatic boots that crack off ice
- D. a weeping chemical anti-icing fluid

48. A crew flying an oceanic crossing without radar coverage maintains separation through:

- A. continuous airborne weather radar surveillance
- B. ground-based approach radar handoffs
- C. precise navigation performance and position reporting
- D. visual separation from other oceanic traffic

49. A pilot reviewing the DECIDE model explains that the model is a continuous loop because the final step is to:

- A. eliminate all remaining risk
- B. evaluate the effect of the action taken
- C. execute the chosen procedure
- D. endorse the decision in the logbook

50. A crew reviewing the takeoff decision speed explains that a failure recognized at or after V1 requires the crew to:

- A. reject the takeoff using maximum braking
- B. continue the takeoff, as the aircraft is committed
- C. continue only if a clearway is present
- D. reduce thrust to regain directional control

51. A pilot reviewing the swept wing explains that it tends to stall first at the wingtips, producing an undesirable nose-up pitch because the tips are:

- A. located aft of the center of gravity
- B. forward of the center of gravity
- C. directly over the main landing gear
- D. ahead of the leading-edge slats

52. A crew reviewing the relationship between aerodynamics and efficiency explains that L/D MAX, the speed of minimum total drag, governs maximum range, best glide, and:

- A. the never-exceed speed in cruise
- B. the minimum control speed in the air
- C. best engine-out driftdown performance
- D. the maximum operating Mach number

53. A pilot reviewing weather products explains that a Convective SIGMET, valid for 2 hours, automatically implies:

- A. mountain obscuration and IFR ceilings
- B. light icing at the freezing level only
- C. volcanic ash lowering visibility
- D. severe turbulence, severe icing, and low-level wind shear

54. A crew reviewing the balanced field length explains that it is the runway length at which:

- A. the takeoff distance equals 60 percent of the runway
- B. accelerate-stop distance equals accelerate-go distance
- C. all four climb-segment gradients are met
- D. the aircraft reaches V_2 at the runway midpoint

55. A pilot reviewing automation discipline explains that the correct response to an automation surprise is to:

- A. re-engage a higher level of automation
- B. continue monitoring without intervening
- C. disconnect it and hand-fly while diagnosing
- D. cycle the autopilot circuit breaker repeatedly

56. A crew reviewing the standard atmosphere explains that the troposphere, where essentially all weather occurs, is characterized by temperature that generally:

- A. decreases with increasing altitude
- B. increases with increasing altitude
- C. remains constant with altitude
- D. fluctuates randomly with no trend

57. A pilot reviewing the relationship between regulations and operations explains that a Standard Instrument Departure (SID) guarantees obstacle clearance only if the aircraft:

- A. is flown entirely on the autopilot
- B. uses maximum continuous thrust throughout
- C. remains below the maximum certificated altitude
- D. meets the published climb gradient

58. A crew reviewing alternate planning needs an airport served only by a non-precision approach. The standard alternate minimums to list it are:

- A. a 600-foot ceiling and 2 statute miles
- B. an 800-foot ceiling and 2 statute miles
- C. a 400-foot ceiling and 1 statute mile

D. a 1,000-foot ceiling and 3 statute miles

59. A pilot reviewing the jet stream explains that, by definition, its core winds are at least:

A. 25 knots

B. 35 knots

C. 50 knots

D. 75 knots

60. A crew reviewing the relationship between weight and landing explains that maximum landing weight is normally lower than maximum takeoff weight because it is limited by:

A. the cabin differential pressure at landing

B. the runway length available at the destination

C. the fuel required for a missed approach

D. structural loads absorbed at the certified touchdown rate

61. A pilot reviewing CRM explains that closed-loop communication on the flight deck means that:

A. only the captain may issue operational commands

B. radio calls are made by the pilot flying only

C. communication is limited to essential ATC exchanges

D. the receiver confirms the message so the sender knows it was understood

62. A crew reviewing the four hypoxia types identifies hypoxia from carbon monoxide poisoning, where the blood cannot carry oxygen, as:

A. hypemic hypoxia

B. hypoxic hypoxia

- C. stagnant hypoxia
- D. histotoxic hypoxia

63. A pilot reviewing the relationship between systems and other functions explains that bleed air is a shared resource used for pressurization, anti-ice, and:

- A. driving the hydraulic engine-driven pumps
- B. charging the main aircraft battery
- C. engine starting
- D. powering the navigation displays

64. A crew reviewing the relationship between aerodynamics and high-speed flight explains that Mach buffet is produced by:

- A. the yaw damper applying excessive rudder
- B. airflow separating behind a shock wave and striking the tail
- C. ice accumulating on the wing leading edge
- D. fuel sloshing in partially filled wing tanks

65. A pilot reviewing the relationship between regulations and currency explains that PIC currency for carrying passengers requires, in the same category and class:

- A. three takeoffs and landings within the preceding 90 days
- B. six instrument approaches within the preceding 6 months
- C. a flight review within the preceding 12 months only
- D. a logbook endorsement before each flight

66. A crew reviewing the relationship between weather and stability explains that stable air, resisting vertical motion, produces:

- A. cumuliform clouds, turbulence, and showers
- B. towering cumulus and good visibility
- C. stratiform clouds, smooth air, and poor visibility
- D. rapidly building thunderstorms and hail

67. A pilot reviewing the relationship between aerodynamics and design explains that sweep raises the critical Mach number by:

- A. increasing the lift produced at low speed
- B. eliminating the spanwise airflow entirely
- C. lowering the aircraft's structural weight
- D. reducing the effective airflow velocity over the wing

68. A crew reviewing the relationship between regulations and dispatch explains that the dispatcher, working from the ground, has the authority to:

- A. amend or cancel the dispatch release
- B. assume physical control of the aircraft remotely
- C. override ATC clearances during the flight
- D. waive the aircraft's airworthiness requirements

69. A pilot reviewing the relationship between aeromedical factors and disorientation explains that the only reliable defense against spatial disorientation is to:

- A. rely on bodily sensations of attitude
- B. close the eyes momentarily to reset the inner ear
- C. increase bank angle to stabilize the inner ear
- D. trust and fly by reference to the flight instruments

70. A crew reviewing the relationship between weather products and hazards explains that an AIRMET Tango specifically addresses:

- A. moderate icing and freezing levels
- B. moderate turbulence and sustained surface winds of 30 knots or more
- C. IFR conditions and mountain obscuration
- D. thunderstorms and associated severe hazards

71. A pilot reviewing the relationship between regulations and fatigue explains that the minimum rest before a flight duty period under Part 117 is:

- A. 8 hours, with a 6-hour sleep opportunity
- B. 10 hours, with an 8-hour sleep opportunity
- C. 9 hours, with a 7-hour sleep opportunity
- D. 12 hours, with a 10-hour sleep opportunity

72. A crew reviewing the relationship between systems and emergencies explains that a single hydraulic system loss:

- A. leaves controllability via the remaining systems and checklist
- B. eliminates all flight control authority
- C. requires immediate deployment of the ram air turbine
- D. prevents extension of the landing gear by any means

73. A pilot reviewing the relationship between aerodynamics and stability explains that the Dutch roll oscillation, common to swept wings, is suppressed by the:

- A. Mach trim system
- B. stick pusher
- C. yaw damper

D. autothrottle

74. A crew reviewing the relationship between regulations and weather explains that under the 1-2-3 rule, an alternate IS required when the destination forecast, within ± 1 hour of the ETA, shows:

- A. a 2,500-foot ceiling and 4 statute miles visibility
- B. a 1,500-foot ceiling and 3 statute miles visibility
- C. a 2,000-foot ceiling and 3 statute miles visibility
- D. a 3,000-foot ceiling and 5 statute miles visibility

75. A pilot reviewing the relationship between aerodynamics and the drag curve explains that below L/D MAX, the dominant drag component that increases is:

- A. parasite drag, which rises with the square of velocity
- B. wave drag from an early shock wave
- C. induced drag, which rises as airspeed decreases
- D. interference drag, which is independent of speed

76. A crew reviewing the relationship between regulations and the certificate explains that the ATP aeronautical knowledge requirements are contained in:

- A. 14 CFR §61.155
- B. 14 CFR §91.103
- C. 14 CFR §121.333
- D. 14 CFR §135.243

77. A pilot reviewing the relationship between systems and ice protection explains that wing and engine anti-ice on most jets is provided by:

- A. electrical heating elements in the leading edge

- B. a chemical fluid weeping through porous panels
- C. pneumatic boots that inflate cyclically
- D. hot bleed air ducted through the leading edges and inlets

78. A crew reviewing the relationship between weather and fronts explains that a cold front, compared with a warm front, produces:

- A. a wide area of stratiform clouds and steady rain
- B. persistent low ceilings and fog over a large region
- C. a narrow band of intense, showery weather that clears quickly
- D. gradual clearing over many hours after passage

79. A pilot reviewing the relationship between aerodynamics and altitude explains that a climbing jet at constant true airspeed sees its Mach number:

- A. increase, because the speed of sound decreases with falling temperature
- B. decrease, because air density is lower at altitude
- C. remain constant, because true airspeed is unchanged
- D. change only if the outside air warms

80. A crew reviewing the relationship between CRM and workload explains that the dangerous failure mode where a crew becomes so absorbed in one problem that they neglect to fly the aircraft is called:

- A. closed-loop communication
- B. task saturation or fixation
- C. threat-and-error management
- D. a shallow authority gradient

81. A pilot reviewing the relationship between regulations and the R-ATP explains that a Restricted ATP holder may serve as:

- A. pilot-in-command of a Part 121 air carrier flight
- B. a designated examiner for ATP applicants
- C. a dispatcher with operational control authority
- D. second-in-command until reaching 1,500 total hours

82. A crew reviewing the relationship between systems and the electrical hierarchy explains that when generating capacity is lost, non-essential loads are automatically shed in order to:

- A. preserve power to the essential and battery buses
- B. transfer hydraulic power to the electric pumps
- C. recharge the main battery more quickly
- D. increase the total power available to all buses

83. A pilot reviewing the relationship between aerodynamics and stall behavior explains that wing fences and vortex generators are installed to:

- A. increase the wing's critical Mach number
- B. reduce the swept wing's tendency to stall at the tips first
- C. eliminate the need for trailing-edge flaps
- D. lower the aircraft's maximum takeoff weight

84. A crew reviewing the relationship between regulations and operational control explains that in domestic Part 121 operations, the dispatch release must be agreed to by:

- A. the captain alone
- B. the chief pilot and the FAA
- C. air traffic control and the dispatcher
- D. both the pilot-in-command and the dispatcher

85. A pilot reviewing the relationship between weather and pressure systems explains that a low-pressure system in the Northern Hemisphere has air that is:

- A. descending and diverging, producing fair weather
- B. circulating clockwise and outward
- C. rising and converging, producing clouds and precipitation
- D. stationary, producing clear skies

86. A crew reviewing the relationship between aerodynamics and the chordwise airflow explains that the chordwise component on a swept wing is responsible for:

- A. triggering compressibility effects over the wing
- B. producing most of the lift at low speed
- C. relieving wing-bending stress at the root
- D. damping the Dutch roll oscillation

87. A pilot reviewing the relationship between regulations and the dispatch release explains that, in addition to route and weather, the release must specify the alternate(s) and the:

- A. names of all cabin crew
- B. minimum fuel for the flight
- C. complete maintenance history
- D. expected passenger load factor

88. A crew reviewing the relationship between aeromedical factors and altitude explains that passenger oxygen masks typically deploy automatically at a cabin altitude of approximately:

- A. 8,000 feet
- B. 10,000 feet
- C. 14,000 feet

D. 18,000 feet

89. A pilot reviewing the relationship between aerodynamics and stability explains that an aft (but legal) CG provides a small benefit of:

- A. a higher stall speed for safety margin
- B. greater longitudinal stability in pitch
- C. slightly improved cruise fuel efficiency
- D. an inability to rotate at the normal speed

90. A crew reviewing the relationship between systems and DC power explains that DC power on a transport is produced from AC power by:

- A. static inverters
- B. the ram air turbine alone
- C. the engine-driven hydraulic pumps
- D. transformer rectifier units (TRUs)

91. A pilot reviewing the relationship between regulations and currency explains that instrument currency requires, within the preceding 6 calendar months, six approaches, holding, and:

- A. two precision approaches in actual conditions
- B. intercepting and tracking courses using navigation systems
- C. a logged instrument proficiency check
- D. 10 hours of actual instrument time

92. An aircraft's CG is at fuselage station 968 inches, with the leading edge of the MAC at station 920 and a MAC length of 120 inches. The CG as a percentage of MAC is:

- A. 9.6 percent MAC

- B. 25 percent MAC
- C. 48 percent MAC
- D. 40 percent MAC

93. A pilot reviewing the relationship between weather and fog explains that radiation fog, unlike advection fog, forms in:

- A. calm conditions overnight and burns off with daytime heating
- B. windy conditions over a cool surface
- C. warm moist air moving over a cooler surface
- D. the presence of warm rain through cooler air

94. A crew reviewing the relationship between regulations and reduced thrust explains that reduced-thrust takeoffs are prohibited when the runway is:

- A. dry but shorter than the balanced field length
- B. wet with reported good braking action
- C. contaminated with snow, slush, or standing water
- D. at a high-elevation airport

95. A pilot reviewing the relationship between aerodynamics and the takeoff climb explains that the first segment extends from liftoff until the:

- A. landing gear is fully retracted
- B. aircraft reaches 1,500 feet AGL
- C. flaps reach the en route setting
- D. final climb speed is reached

96. A crew reviewing the relationship between weather products and the GFA explains that the Graphical Forecasts for Aviation is:

- A. an hourly coded surface observation
- B. a 24-hour terminal forecast for one airport
- C. a single static chart valid at one time
- D. the primary interactive graphical briefing tool for the U.S.

97. A pilot reviewing the relationship between aerodynamics and rotation explains that VR, the rotation speed, is always:

- A. less than V1 to ensure an early liftoff
- B. equal to or greater than V1
- C. equal to V2 at the screen height
- D. independent of takeoff weight

98. A crew reviewing the relationship between regulations and operations explains that operational control in domestic Part 121 is:

- A. shared jointly between the PIC and the dispatcher
- B. held solely by the captain once airborne
- C. delegated entirely to air traffic control
- D. retained exclusively by the chief pilot

99. A pilot reviewing the relationship between weather and icing explains that the most dangerous form of structural icing is:

- A. rime ice from small droplets in colder air
- B. frost forming overnight on a parked aircraft
- C. clear (glaze) ice from large supercooled droplets and freezing rain
- D. a trace of mixed ice in thin stratiform cloud

100. A crew reviewing the relationship between regulations and the medical certificate explains that a Part 121 PIC must hold:

- A. a second-class medical certificate
- B. a first-class medical certificate
- C. a third-class medical certificate
- D. any class, provided it is current

101. A pilot reviewing the relationship between aerodynamics and the engine-out cruise explains that a twin cannot maintain cruise altitude on one engine because the available thrust is:

- A. more than sufficient to continue climbing
- B. exactly equal to the thrust required for level flight
- C. unaffected by the loss of one engine
- D. insufficient to sustain level flight, requiring a driftdown

102. A crew reviewing the relationship between regulations and risk explains that risk is assessed by combining:

- A. the likelihood and the severity of the hazard
- B. the time and cost of mitigation
- C. the convenience and effort required
- D. the distance and fuel remaining

103. A pilot reviewing the relationship between weather and the winds aloft forecast explains that a coded group of "9900" indicates wind that is:

- A. from 099° at 100 knots
- B. calm with zero movement
- C. light and variable, less than 5 knots

D. from due north at 99 knots

104. A crew reviewing the relationship between regulations and the MEL explains that an operator's MEL, relative to the Master MEL, may be:

- A. less restrictive with a waiver
- B. identical only, with no variation
- C. ignored if the captain deems an item minor
- D. more restrictive, but never less

105. A pilot reviewing the relationship between aeromedical factors and hypoxia explains that hypoxia from impaired blood circulation, such as pooling under G-forces, is classified as:

- A. hypoxic hypoxia
- B. stagnant hypoxia
- C. histotoxic hypoxia
- D. hypemic hypoxia

106. A crew reviewing the relationship between aerodynamics and the lift equation explains that velocity enters the lift equation as a:

- A. square, so doubling speed quadruples available lift
- B. linear term, so doubling speed doubles lift
- C. cube, so doubling speed multiplies lift eightfold
- D. constant unrelated to lift

107. A pilot reviewing the relationship between regulations and the certificate age explains that an unrestricted ATP applicant must be at least:

- A. 18 years old

- B. 21 years old
- C. 25 years old
- D. 23 years old

108. A crew reviewing the relationship between weather and the SIGMET explains that a non-convective SIGMET advises all aircraft of:

- A. moderate icing and freezing levels only
- B. severe icing, severe turbulence, and volcanic ash
- C. IFR ceilings and mountain obscuration
- D. thunderstorms exclusively

109. A pilot reviewing the relationship between CRM and the authority gradient explains that a gradient that is too steep:

- A. provides ideal command authority and crew balance
- B. has no effect on flight-deck communication
- C. suppresses the first officer's willingness to speak up
- D. encourages excessive input from the first officer

110. A crew decoding a high-level winds aloft group "764250" understands the wind exceeds 100 knots, decoding the direction-and-speed portion "7642" as:

- A. 076° at 42 knots
- B. 176° at 142 knots
- C. 026° at 142 knots
- D. 260° at 142 knots

111. A pilot reviewing the relationship between aerodynamics and the moist adiabatic lapse rate explains that it is lower than the dry rate because:

- A. saturated air is denser and cools faster
- B. the moist rate applies only above the tropopause
- C. condensation releases latent heat that partly offsets cooling
- D. water vapor speeds the temperature decrease

112. A crew reviewing the relationship between regulations and the takeoff distances explains that a stopway at the end of a runway extends the:

- A. takeoff distance available (TODA)
- B. accelerate-stop distance available (ASDA)
- C. landing distance available (LDA)
- D. takeoff run available (TORA)

113. A pilot reviewing the relationship between aerodynamics and the second segment explains that the second-segment climb gradient is most often the:

- A. least restrictive of all climb segments
- B. only segment with no gradient requirement
- C. limiting factor for the maximum takeoff weight
- D. segment flown after the flaps are fully retracted

114. A crew reviewing the relationship between regulations and the cabin-altitude warning explains that it typically activates at a cabin altitude of approximately:

- A. 10,000 feet
- B. 6,000 feet
- C. 14,000 feet
- D. 18,000 feet

115. A pilot reviewing the relationship between systems and the FMS explains that the FMS determines aircraft position by:

- A. blending sensors such as GPS and inertial reference
- B. relying solely on a single VOR/DME
- C. using the standby instruments as the primary reference
- D. averaging the crew's manual position entries

116. A crew reviewing the relationship between regulations and the fuel rule explains that even when no alternate is required, a domestic Part 121 flight must carry, beyond destination fuel, a reserve of:

- A. 30 minutes at holding speed
- B. 60 minutes at maximum endurance
- C. 90 minutes at best-glide speed
- D. 45 minutes at normal cruise

117. A pilot reviewing the relationship between aerodynamics and emergency descent explains that during an emergency descent after an explosive decompression with suspected structural damage, the crew should:

- A. descend at the maximum operating speed regardless
- B. reduce speed to avoid aggravating the damage
- C. maintain cruise altitude until repressurized
- D. extend the gear as the only means of descent

118. A crew reviewing the relationship between weather and CAT explains that clear air turbulence is most severe on the:

- A. warm (equatorial) side of the jet stream
- B. cold (polar) side of the jet stream, near the core

- C. surface beneath the jet stream
- D. far downstream edge of the jet stream

119. A pilot reviewing the relationship between systems and the engine-fire memory items explains that they include closing the thrust lever, cutting off fuel and the engine, and:

- A. increasing thrust to blow out the fire
- B. restarting the affected engine immediately
- C. discharging the fire extinguisher into that engine
- D. descending below 10,000 feet first

120. A crew reviewing the relationship between regulations and the STAR explains that a Standard Terminal Arrival Route transitions an aircraft from:

- A. the runway to the en route structure
- B. one airway to a parallel airway
- C. the holding fix to the missed approach point
- D. the en route structure to the approach environment

121. A weight of 9,000 lb is shifted 160 inches on an aircraft with a total weight of 180,000 lb. The CG moves:

- A. 6 inches
- B. 12 inches
- C. 16 inches
- D. 8 inches

122. A pilot reviewing the relationship between regulations and the hazardous attitudes explains that the antidote to the resignation attitude ("what's the use?") is:

- A. I'm not helpless; I can make a difference
- B. taking chances is foolish
- C. not so fast; think first
- D. it could happen to me

123. A crew reviewing the relationship between aerodynamics and high-altitude stall explains that the high-altitude stall recovery, unlike at low altitude, prioritizes:

- A. reducing the angle of attack and accepting altitude loss
- B. applying maximum thrust to power out
- C. maintaining altitude while increasing back pressure
- D. banking steeply to unload the wing

124. A crew reviewing the relationship between regulations and the convective product explains that a Convective SIGMET specifically addresses hazards associated with:

- A. severe clear air turbulence near the jet stream
- B. volcanic ash lowering visibility
- C. thunderstorms and their associated hazards
- D. widespread mountain obscuration

125. A pilot reviewing the relationship between weather and the temperature inversion explains that an inversion is a layer in which temperature:

- A. decreases rapidly, producing instability
- B. increases with altitude, producing very stable air
- C. remains constant, producing neutral stability
- D. oscillates, producing alternating cloud layers

Answer Key

1. C — Sweep reduces low-speed lift as a trade for a higher critical Mach number and faster cruise; only the chordwise airflow drives compressibility, so sweep delays it. The low-speed penalty is accepted for the high-speed gain.
2. B — With an engine failed past V1, the immediate handling task is applying rudder to control the yaw toward the dead engine. Maintaining directional control against asymmetric thrust takes priority over drag reduction.
3. D — CG equals total moment \div total weight: $112,000,000 \div 175,000 = 640$ inches aft of datum. This division is the core of every weight-and-balance computation.
4. A — Driftdown is flown at L/D MAX to minimize the descent rate, allowing the aircraft to level off as high as possible on one engine — critical over high terrain. A twin cannot usually hold cruise altitude on one engine.
5. C — The second segment, the most critical, is flown at V2 with takeoff flaps from gear-up to at least 400 feet and requires a 2.4 percent gradient for a twin. It frequently limits takeoff weight.
6. A — Increasing load factor in a steep turn raises the stall speed, narrowing the already small margin in the coffin corner and risking a stall or buffet. The convergence of stall and Mach limits makes this dangerous.
7. D — Mach tuck is self-reinforcing because the increasing speed strengthens the shock wave and shifts the center of lift further aft, deepening the nose-down pitch. Mach trim systems normally prevent it.
8. B — Under shared operational control, a material change to the release requires it to be amended and re-agreed before departure; either the captain or dispatcher can stop the flight. Authority does not shift at the gate.
9. C — A 2,500-foot ceiling and 4 statute miles visibility both exceed the 1-2-3 thresholds (2,000 ft / 3 SM), so no alternate is required. Both thresholds must be met, and here both are.

10. D — The maximum zero fuel weight caps non-fuel weight before fuel is loaded, protecting the wing root: payload increases wing-bending stress while wing fuel relieves it. The other limits apply at different points.

11. C — Wing and engine anti-ice draw bleed air, reducing what is available for pressurization and slightly lowering thrust. This cross-system dependency is a managed trade, not a thrust increase or pressurization loss.

12. B — In a total loss of engine-driven generators, the battery and ram air turbine generator power the essential buses while the crew flies on standby instruments. The packs, hydraulic pumps, and TRUs cannot substitute.

13. D — A ceiling is the lowest broken or overcast layer; here BKN004 (400 feet) is the lowest such layer and therefore the ceiling. The overcast at 1,200 feet is higher and does not govern.

14. A — Weather radar detects precipitation, not the clear-air wind shear that causes CAT, so CAT is invisible to it. This is why PIREPs and forecasts are the best available warning.

15. A — After the initial airspeed gain and balloon, a microburst delivers a sinking downdraft and a performance-decreasing tailwind, leaving the aircraft low and slow. Reducing power in response to the initial gain is therefore dangerous.

16. B — Freezing rain indicates a layer of warmer air aloft and produces rapid clear ice, making it the most hazardous icing condition. It signals worsening, not improving, conditions.

17. C — Encountering volcanic ash calls for immediately reducing thrust and exiting the cloud, typically with a 180° turn. Ash melts in the engine hot section and is radar-invisible, so climbing through or navigating with radar is wrong.

18. B — A TAF "TEMPO" group indicates temporary fluctuations expected to last less than an hour each within the stated window (0600Z–0800Z). FM is a rapid complete change, BECMG is gradual, and PROB is a probability.

19. A — If the runway environment is not in sight at the MDA by the missed approach point, the crew must execute the missed approach. Descending below the MDA without references is prohibited.

20. C — RNP's defining feature, which basic RNAV lacks, is on-board performance monitoring and alerting, warning the crew when required accuracy can no longer be met. The other options are not unique to RNP.

21. D — A 0300 report (deep in the circadian low) with five segments yields one of the shortest maximum FDPs, because both the early start and many segments increase fatigue. Favorable daytime starts with few segments are longest.

22. D — At FL370 the time of useful consciousness is only seconds, which is why donning oxygen is the immediate first action, before any troubleshooting. TUC collapses dramatically with altitude.

23. A — Thrust alone cannot break a high-altitude stall because the thin air provides little excess thrust; recovery requires reducing the angle of attack and accepting altitude loss. The "power out" reflex is appropriate only at low altitude.

24. C — Mach number is $TAS \div \text{local speed of sound}$: $500 \div 595 \approx 0.84$. This places the aircraft in the high subsonic cruise range.

25. B — During a windshear escape the crew must NOT change configuration (gear or flaps); they apply maximum thrust, follow the flight-director/stick-shaker pitch, and add energy. Configuration changes during the escape are hazardous.

26. D — After continuing an engine-fire takeoff past V1 and completing the memory items, the crew plans to land as soon as possible at a suitable airport. Fire is a land-immediately emergency.

27. B — The tropopause near 36,000 feet is where temperature stops falling at approximately -56.5°C , and it is the home of the jet stream and the worst CAT. The other figures are incorrect.

28. A — At the decision altitude with the runway in sight and the aircraft in a position to land, the crew continues the approach and lands. The DA is a go/no-go point, not a level-off or extra-descent point.

29. C — High density altitude (hot, high field) reduces both engine thrust and aerodynamic performance because the air is less dense. This degrades takeoff and increases required runway.

30. A — At FL220 (above 14,000 feet), the standard holding inbound leg is 1.5 minutes (1 minute at or below 14,000 feet), adjusted for wind. The longer leg accommodates higher true airspeeds.

31. B — Domestic Part 121 fuel must reach the destination, then the most distant alternate, then provide 45 minutes at normal cruise consumption. The reserve is added after the alternate, not held at the destination.

32. D — A Part 121 PIC must hold an ATP certificate and a first-class medical certificate. The first-class medical is required for air carrier PIC duty.

33. C — A deferred MEL item must be placarded inoperative, have the procedures completed, and have any specified conditions and limitations observed. These conditions make the deferral legal without notifying the FAA or removing the item.

34. B — The insidious danger of hypoxia is that it impairs judgment before the victim recognizes it; early symptoms like euphoria appear without distress. This is why immediate oxygen is the rule.

35. D — Hail and severe turbulence can be encountered in clear air beneath and beside a thunderstorm, not just inside it — hail can be thrown miles under the anvil. This is why wide avoidance is required.

36. C — A Minimum Descent Altitude is used on approaches providing lateral guidance only, with no electronic glideslope (non-precision). A Decision Altitude is used on approaches with vertical guidance.

37. A — As density falls with altitude, the wing must fly at a higher true airspeed for a given indicated airspeed to maintain lift. This is why a jet's TAS far exceeds its indicated airspeed at altitude.

38. C — RVSM provides 1,000-foot vertical separation between FL290 and FL410, nearly doubling usable altitudes. It requires approved altitude-keeping equipment and operator authorization.

39. B — "I must act right now" is the impulsivity attitude, countered by "not so fast; think first." Recognizing the attitude precedes applying the antidote.

40. A — Maximum continuous thrust is the highest thrust permitted for unlimited duration and is the relevant ceiling during engine-out climb. Takeoff thrust, by contrast, is time-limited.

41. A — The pilot monitoring actively monitors the flight path and automation and speaks up on any deviation, a role as vital as the pilot flying. Manipulating the controls is the flying pilot's task.

42. D — Tower-reported surface winds are referenced to magnetic north, whereas winds aloft forecasts use true north. Recognizing which reference applies prevents heading errors.

43. C — Severe icing beyond the aircraft's certification envelope is an exit-the-conditions emergency; the crew should leave the icing as soon as possible. Continuing or slowing into a stall would worsen the hazard.

44. D — Using 2°C per 1,000 feet from $+15^{\circ}\text{C}$: $15 - (2 \times 35) = 15 - 70 = -55^{\circ}\text{C}$ at 35,000 feet. The standard lapse rate gives a straightforward linear estimate.

45. B — Cabin pressure is regulated mainly by the outflow valve, which meters air leaving the cabin; inflow from the packs is relatively constant. Closing the valve raises pressure, opening it lowers pressure.

46. D — A qualifying graduate of an approved two-year aviation degree program may be issued the R-ATP at 1,250 hours. The four-year threshold is 1,000 hours and military is 750 hours.

47. A — Pitot tubes and static ports are electrically heated to keep flight data accurate. Unheated pitot-static sensors can ice over and produce dangerously erroneous airspeed and altitude indications.

48. C — In oceanic airspace without radar, separation depends on precise navigation performance and accurate position reporting. A deviation that radar would catch over land can go undetected over the ocean.

49. B — The DECIDE model ends in Evaluate — assessing the effect of the action taken, which makes it a continuous loop. The steps are Detect, Estimate, Choose, Identify, Do, Evaluate.
50. B — An engine failure recognized at or after V1 requires continuing the takeoff, because there is no longer enough runway to stop. The aircraft is committed at V1.
51. A — A swept wing stalls at the tips first; because the tips are located aft of the center of gravity, losing lift there shifts the center of lift forward and pitches the nose up. Wing fences mitigate this.
52. C — L/D MAX, the speed of minimum total drag, governs maximum range, best glide, and best engine-out driftdown performance. The same efficiency speed serves all three.
53. D — A Convective SIGMET automatically implies severe turbulence, severe icing, and low-level wind shear, so those are not issued separately. It is valid for 2 hours over the contiguous U.S.
54. B — The balanced field length is where accelerate-stop distance equals accelerate-go distance for the chosen V1, the most runway-efficient condition. The other options misstate it.
55. C — The correct response to an automation surprise is to disconnect it and hand-fly while diagnosing the problem. Automation does what it is told, not always what the crew intended.
56. A — Within the troposphere, temperature generally decreases with altitude, which is why essentially all weather occurs in this layer. The decrease stops at the tropopause.
57. D — A SID guarantees obstacle clearance only if the aircraft meets the published climb gradient. If weight, temperature, or an engine failure prevents meeting it, obstacle protection is not assured.
58. B — Standard alternate minimums for a non-precision approach are an 800-foot ceiling and 2 statute miles visibility (600-2 for precision). These differ from the destination 1-2-3 trigger.
59. C — By definition, jet stream core winds are 50 knots or greater, frequently exceeding 100. Jet streams form along sharp temperature boundaries near the tropopause.

60. D — Maximum landing weight is limited by the structural loads the gear and airframe absorb at the certified touchdown descent rate, which is why it is normally lower than MTOW and may require fuel burn-off.

61. D — Closed-loop communication means the receiver confirms the message so the sender knows it was understood — the same principle as an ATC readback. It prevents miscommunication.

62. A — Carbon monoxide poisoning produces hypemic hypoxia, in which the blood cannot carry oxygen. It is distinct from hypoxic (altitude), stagnant (circulation), and histotoxic (cell-use) hypoxia.

63. C — Bleed air is a shared resource used for pressurization, anti-ice, and engine starting. It does not drive the hydraulic engine-driven pumps, charge the battery, or power the displays.

64. B — Mach buffet results from airflow separating behind the shock wave that forms past critical Mach, with the turbulent flow striking the tail. It is the high-speed counterpart to low-speed stall buffet.

65. A — PIC currency for carrying passengers requires three takeoffs and landings within the preceding 90 days in the same category and class. The six-approach rule is instrument currency, a separate requirement.

66. C — Stable air resists vertical motion, producing stratiform clouds, smooth air, and poor visibility from trapped haze and fog. Unstable air produces the cumuliform clouds and turbulence of the other options.

67. D — Sweep raises the critical Mach number by reducing the effective airflow velocity the wing experiences, so local flow reaches Mach 1.0 at a higher actual aircraft Mach number. This is the high-speed benefit of sweep.

68. A — The dispatcher, sharing operational control from the ground, may amend or cancel the dispatch release and prevent or divert the flight. The dispatcher cannot physically fly the aircraft or override ATC.

69. D — The only reliable defense against spatial disorientation is to trust and fly by reference to the flight instruments, since the vestibular senses produce false cues without visual references. "Flying by feel" worsens it.

70. B — AIRMET Tango specifically addresses moderate turbulence, sustained surface winds of 30 knots or more, and low-level wind shear. Sierra covers IFR/obscuration and Zulu covers icing.

71. B — Part 117 requires a minimum 10-hour rest period before a flight duty period, including an opportunity for at least 8 uninterrupted hours of sleep. This science-based rule replaced the older Part 121 limits.

72. A — A single hydraulic system loss leaves controllability via the remaining independent systems, with degraded functions managed by the appropriate checklist. Redundancy is precisely why one loss is not catastrophic.

73. C — The yaw damper suppresses the Dutch roll oscillation, a coupled roll-yaw motion that wing sweep aggravates. An inoperative yaw damper often restricts the aircraft to lower altitudes.

74. B — Under the 1-2-3 rule, an alternate IS required when the forecast fails either threshold; a 1,500-foot ceiling is below the 2,000-foot minimum, so an alternate must be listed even though visibility meets 3 miles. The others meet both thresholds.

75. C — Below L/D MAX, induced drag dominates and rises as airspeed decreases and angle of attack increases. This is the back side of the drag curve, where flying slower requires more thrust.

76. A — The ATP aeronautical knowledge requirements are contained in 14 CFR §61.155, with the multiengine training prerequisite in §61.156. Parts 91/121/135 govern operations, not the certificate's knowledge requirements.

77. D — Wing and engine anti-ice on most jets uses hot bleed air ducted through the leading edges and inlets — a thermal system. Windshields and probes use electrical heat instead.

78. C — A cold front produces a narrow band of intense, showery weather that clears quickly, with cumuliform clouds and gusty winds. Warm fronts produce the wide stratiform decks and steady rain.

79. A — A climbing jet's Mach number increases at constant true airspeed because the speed of sound decreases with falling temperature. A jet can approach its Mach limit just by climbing.

80. B — Task saturation or fixation is the dangerous failure mode where a crew becomes so absorbed in one problem that they neglect to fly the aircraft. It has caused controlled-flight-into-terrain accidents.

81. D — A Restricted ATP holder may serve only as second-in-command (first officer) until reaching 1,500 total hours. It does not permit Part 121 PIC duty or examiner/dispatcher roles.

82. A — The electrical system sheds non-essential loads when generating capacity is lost in order to preserve power to the essential and battery buses that feed flight-critical systems. Shedding does not create more total power.

83. B — Wing fences and vortex generators control spanwise flow to reduce the swept wing's tendency to stall at the tips first. They do not raise critical Mach, eliminate flaps, or lower takeoff weight.

84. D — In domestic Part 121 operations, the dispatch release must be agreed to by both the pilot-in-command and the dispatcher, reflecting their jointly shared operational control. Either can prevent or divert the flight.

85. C — A low-pressure system has rising, converging air that cools and condenses moisture, producing clouds and precipitation. In the Northern Hemisphere it circulates counterclockwise and inward.

86. A — On a swept wing, the chordwise component of airflow (perpendicular to the leading edge) is responsible for triggering compressibility effects; the spanwise component does not. This is exactly why sweep delays compressibility.

87. B — The dispatch release must specify, among other items, the alternate(s) and the minimum fuel for the flight, along with route, weather, and restrictions. It does not record cabin-crew names or load factor.

88. C — Passenger oxygen masks typically deploy automatically at about 14,000 feet cabin altitude. The cabin-altitude warning to the crew activates earlier, around 10,000 feet.

89. C — An aft (but legal) CG reduces tail download and trim drag, slightly improving cruise fuel efficiency. The trade-off is reduced longitudinal stability, so operators stay within limits.

90. D — DC power is produced from AC through Transformer Rectifier Units (TRUs). Static inverters do the reverse (DC to AC) for essential AC loads.

91. B — Instrument currency (the "6-HIT") requires, within the preceding 6 calendar months, six approaches, holding, and intercepting and tracking courses using navigation systems. It need not be in actual conditions.

92. D — Percent MAC = $(CG \text{ arm} - LEMAC) \div MAC \times 100 = (968 - 920) \div 120 \times 100 = 40$ percent MAC. This converts a CG station into a percentage of the mean aerodynamic chord.

93. A — Radiation fog forms in calm conditions overnight as the ground cools, and it burns off with daytime heating. Advection fog, by contrast, requires wind and warm moist air over a cooler surface.

94. C — Reduced-thrust takeoffs are prohibited on contaminated runways (snow, slush, standing water) because the reduced performance margin is unacceptable when braking and acceleration are degraded.

95. A — The first takeoff climb segment extends from liftoff (35 feet) until the landing gear is fully retracted, flown at takeoff thrust with takeoff flaps. Its minimum gradient for a twin is positive.

96. D — The Graphical Forecasts for Aviation (GFA) is the primary interactive graphical briefing tool for the continental U.S., presenting observations and forecasts across time and altitude. It has largely replaced older static products.

97. B — VR, the rotation speed, is always equal to or greater than V1, ensuring rotation does not begin before the decision speed. Rotating too early risks a tail strike or liftoff below a safe speed.

98. A — In domestic Part 121 operations, operational control is shared jointly between the PIC and the dispatcher; both must agree to the release and either can stop or divert the flight.

99. C — Clear (glaze) ice from large supercooled droplets and freezing rain is the most dangerous structural icing — heavy, hard, smooth, and tenacious. Rime, frost, and a trace of mixed ice are less dangerous.

100. B — A Part 121 PIC must hold a first-class medical certificate (and an ATP certificate). The first-class medical is required for air carrier PIC duty.

101. D — At high cruise altitude on one engine, the available thrust is insufficient to sustain level flight, requiring a driftdown to a lower sustainable altitude. This is the basis of engine-out cruise planning.

102. A — Risk is assessed by combining the likelihood and the severity of a hazard. Pairing the wrong two factors (time/cost, convenience/effort, distance/fuel) is a common distractor.

103. C — A winds aloft coded group of 9900 means the wind is light and variable, defined as less than 5 knots. It is not a numerical direction or speed.

104. D — An operator's MEL may be more restrictive than the manufacturer's Master MEL, but never less. An item not addressed or required to be operative makes the aircraft un-dispatchable.

105. B — Stagnant hypoxia results from impaired blood circulation, such as blood pooling under G-forces. It is distinct from hypoxic, hypemic, and histotoxic hypoxia.

106. A — In the lift equation ($L = \frac{1}{2} \rho V^2 S C_L$), velocity enters as a square, so doubling speed quadruples available lift — and also quadruples parasite drag. This is why speed dominates the lift relationship.

107. D — An applicant for an unrestricted ATP certificate must be at least 23 years old (21 for a restricted ATP). This age requirement is a frequently tested recall item.

108. B — A non-convective SIGMET advises all aircraft of severe icing, severe or extreme turbulence, clear air turbulence, dust/sand storms, and volcanic ash. AIRMETs cover the moderate end.

109. C — An authority gradient that is too steep (an intimidating captain) suppresses the first officer's willingness to speak up. A healthy gradient keeps clear command while encouraging input.

110. D — A direction digit of 76 signals winds over 100 knots: subtract 50 ($76 - 50 = 260^\circ$) and add 100 to the speed ($42 + 100 = 142$). "7642" decodes to 260° at 142 knots.

111. C — The moist adiabatic lapse rate is lower than the dry rate because condensation in saturated rising air releases latent heat that partly offsets the cooling. This is why saturated parcels cool more slowly.

112. B — A stopway extends the accelerate-stop distance available (ASDA); a clearway extends the takeoff distance available (TODA). Knowing which surface extends which distance is a tested distinction.

113. C — The second-segment climb gradient is most often the limiting factor for the maximum takeoff weight, because it is the most demanding engine-out segment. It is not the least restrictive or flaps-up segment.

114. A — A cabin-altitude warning typically activates at about 10,000 feet cabin altitude, alerting the crew before hypoxia becomes severe. Masks deploy later, around 14,000 feet.

115. A — The FMS blends navigation sensors such as GPS and inertial reference (and radio aids) to determine position and drive the autopilot/autothrottle. It does not rely on a single station or the standby instruments.

116. D — Even when no alternate is required, a domestic Part 121 flight must carry a 45-minute reserve at normal cruise consumption beyond destination fuel. This reserve is non-negotiable.

117. B — When an explosive decompression may have caused structural damage, the crew reduces speed during the emergency descent to avoid aggravating the damage. Normally the descent is flown at maximum appropriate speed.

118. B — Clear air turbulence is most severe on the cold (polar) side of the jet stream, near the core, where wind shear is greatest. It is also associated with the tropopause and mountain waves.

119. C — The engine-fire memory items include closing the thrust lever, cutting off fuel and the engine via the fire handle, and discharging the fire extinguisher into that engine. A second bottle follows if the warning persists.

120. D — A STAR transitions an aircraft from the en route structure to the approach environment, often with published crossing altitudes and speeds. A SID does the reverse after takeoff.

121. D — CG shift equals $(\text{weight moved} \times \text{distance moved}) \div \text{total weight}$: $(9,000 \times 160) \div 180,000 = 8$ inches. The CG moves toward the direction of the shift.

122. A — The antidote to resignation ("what's the use?") is "I'm not helpless; I can make a difference." Resignation surrenders the active problem-solving a pilot must maintain.

123. A — High-altitude stall recovery prioritizes reducing the angle of attack and accepting altitude loss, because thin air provides little excess thrust to power out. Pulling or relying on thrust can deepen the stall.

124. C — A Convective SIGMET specifically addresses thunderstorm-related hazards (severe, embedded, lines, or areas of thunderstorms) and automatically implies severe turbulence, severe icing, and low-level wind shear.

125. B — A temperature inversion is a layer where temperature increases with altitude, the reverse of normal, producing very stable air that traps moisture and pollutants and reduces visibility.