PRACTICE EXAM 8 (60 QS)

1. Which gas makes up approximately 78% of the atmosphere?

A. Oxygen

B. Nitrogen

C. Carbon dioxide

2. Nearly all weather phenomena occur in which layer of the atmosphere?

A. The stratosphere

B. The tropopause

C. The troposphere

3. The standard temperature lapse rate in the lower atmosphere is approximately:

A. 3.5°C per 1,000 feet

B. 2°C per 1,000 feet

C. 5°C per 1,000 feet

4. Around a high-pressure system in the Northern Hemisphere, air circulates:

A. Counterclockwise and inward

B. Straight outward with no rotation

C. Clockwise and outward

5. Air that resists vertical motion and returns toward its original level when disturbed is described as:

A. Stable

B. Unstable

C. Saturated

6. Which cloud type is associated with thunderstorms and the greatest aviation hazard?

A. Cirrostratus

B. Altocumulus

C. Cumulonimbus

7. Fog that forms on clear, calm nights as the ground cools by radiation is called:

A. Radiation fog

B. Advection fog

C. Upslope fog

8. Advection fog forms when:

A. Warm, moist air moves over a cooler surface

B. The ground radiates heat on a still, clear night

C. Cold air moves over much warmer water

9. A warm front is typically associated with:

A. A narrow band of violent weather and rapid clearing

B. Widespread layered clouds, steady precipitation, and low ceilings

C. Gusty winds with towering cumulus and good visibility

10. A cold front is characterized by:

A. Fast movement, a narrow band of intense weather, and rapid clearing behind

B. Slow movement and prolonged drizzle over a large area

C. No significant weather changes as it passes

11. The dew point is best defined as the temperature to which air must be:

A. Heated to evaporate all moisture

B. Cooled to become saturated

C. Compressed to release latent heat

12. Unstable air most commonly produces:

A. Smooth air with stratiform clouds and poor visibility

B. No clouds and unlimited visibility

C. Cumuliform clouds, showery precipitation, and turbulence

13. The two conditions both required for structural icing are visible moisture and:

A. High relative humidity above freezing

B. A temperature at or below freezing

C. Clear skies with no precipitation

14. Clear ice, the most hazardous icing type, forms from:

A. Large supercooled droplets that flow back before freezing

B. Small droplets that freeze instantly on contact

C. Dry snow adhering to a cold surface

15. During which thunderstorm stage do updrafts and downdrafts coexist with the heaviest precipitation?

A. The cumulus stage

B. The dissipating stage

C. The mature stage

16. Lenticular and rotor clouds near mountains are visual signs of:

A. An approaching warm front

B. Mountain wave activity and severe turbulence

C. Calm, stable air with smooth flight

17. A microburst's most dangerous feature on approach is the rapid change from a:

A. Steady crosswind to a calm

B. Tailwind to a headwind that increases performance

C. Performance-increasing headwind to a performance-decreasing tailwind

18. A METAR is best described as:

A. An observation of current weather conditions

B. A forecast of expected conditions for 24 hours

C. A graphical depiction of pressure systems

19. In a METAR, sky condition "BKN" indicates cloud coverage of:

A. 5 to 7 eighths of the sky

B. 1 to 2 eighths of the sky

C. 8 eighths (complete coverage)

20. A ceiling is defined as the lowest layer reported as:

A. Few or scattered

B. Any visible cloud

C. Broken or overcast

21. A TAF forecasts weather within what radius of the airport?

A. 25 statute miles

B. 10 nautical miles

C. 5 statute miles

22. In a TAF, the change group "BECMG" indicates:

A. A gradual change over a stated period

B. A rapid, significant change at a specific time

C. A temporary fluctuation lasting under an hour

23. AIRMET Sierra provides information about:

A. Turbulence and strong surface winds

B. Icing and freezing levels

C. IFR conditions and mountain obscuration

24. A SIGMET differs from an AIRMET in that a SIGMET warns of weather hazardous to:

A. Light aircraft only

B. Ground operations only

C. All aircraft

25. A Convective SIGMET specifically addresses hazards associated with:

A. Thunderstorms

B. Mountain obscuration

C. Light rime icing

26. The most timely report of actual conditions encountered in flight is a:

A. Surface analysis chart

B. PIREP (pilot report)

C. Terminal aerodrome forecast

27. A pilot requesting a complete weather briefing for a planned flight should request a:

A. Outlook briefing

B. Standard briefing

C. Abbreviated briefing

28. An outlook briefing is appropriate when departure is:

A. Within the next hour

B. Already underway

C. Six or more hours in the future

29. Winds aloft in the forecast are referenced to:

A. Magnetic north

B. The runway heading

C. True north

30. In the winds-aloft forecast, the code "9900" indicates:

A. Winds of 99 knots from 090°

B. Light and variable winds

C. Calm with a temperature of 99°C

31. Tightly spaced isobars on a surface analysis chart indicate:

A. Light, calm winds

B. No wind, only pressure

C. Stronger winds due to a steep pressure gradient

32. The VFR flight category (shown in green) requires a ceiling greater than 3,000 feet and visibility greater than:

A. 5 statute miles

B. 3 statute miles

C. 1 statute mile

33. A small temperature/dew-point spread is a reliable indicator of:

A. Likely fog or low cloud formation

B. Strong, gusty winds aloft

C. Clearing skies and improving conditions

34. A temperature inversion typically produces:

A. Strong convective turbulence and towering cumulus

B. Smooth, stable air with restricted visibility

C. Rapid clearing with unlimited visibility

35. The four types of hypoxia include hypoxic, hypemic, stagnant, and:

A. Histotoxic

B. Hypertonic

C. Hypobaric

36. Hypemic hypoxia, in which the blood cannot carry enough oxygen, can be caused by:

A. Flying above 25,000 feet only

B. Excessive G-forces during maneuvers

C. Carbon monoxide poisoning or anemia

37. One of the earliest and most insidious symptoms of hypoxia is:

A. Euphoria and impaired judgment

B. Sudden sharp chest pain

C. Immediate loss of consciousness

38. Hyperventilation produces symptoms that closely mimic:

A. Carbon monoxide poisoning only

B. Hypoxia

C. Spatial disorientation alone

39. The corrective action for hyperventilation is to:

A. Climb to a higher altitude

B. Consciously slow the breathing rate

C. Increase the breathing rate further

40. At night, the central part of vision has a blind spot because the:

A. Cones in the central retina function poorly in darkness

B. Rods are concentrated only in the central retina

C. Eye loses all color perception at the periphery

41. Full dark adaptation of the eyes takes approximately:

A. 30 minutes

B. 5 minutes

C. 2 hours

42. A narrower-than-usual runway tends to create the illusion that the aircraft is:

A. Too low, prompting a higher approach

B. Too high, prompting a lower approach

C. Perfectly aligned with no illusion

43. An approach over dark, featureless terrain (the "black-hole" effect) creates the illusion of being:

A. Too low, prompting a steep climb

B. Aligned correctly on glidepath

C. Too high, prompting a dangerously low approach

44. Spatial disorientation is best counteracted by:

A. Relying on inner-ear sensations

B. Trusting the flight instruments

C. Making rapid head movements

45. The "leans," the most common vestibular illusion, results from:

A. A rapid acceleration sensed as a pitch-up

B. An unnoticed slow roll, so leveling feels like banking the other way

C. A head movement during a turn causing tumbling

46. The somatogravic illusion causes a rapid acceleration to feel like a:

A. Nose-up pitch attitude

B. Nose-down pitch attitude

C. Level, unchanged attitude

47. The "IM SAFE" checklist assesses the pilot's:

A. Personal fitness for flight

B. Aircraft airworthiness

C. Fuel and weather planning

48. Decompression sickness can result from flying too soon after:

A. A long highway drive

B. A heavy meal

C. Scuba diving

49. The recommended wait after a scuba dive requiring a controlled ascent before flying is:

A. 24 hours

B. 12 hours

C. No wait is necessary

50. Which of the five hazardous attitudes is countered by the antidote "Follow the rules; they are usually right"?

A. Anti-authority

B. Impulsivity

C. Macho

51. The hazardous attitude of resignation is countered by the antidote:

A. "Taking chances is foolish"

B. "I'm not helpless; I can make a difference"

C. "It could happen to me"

52. The PAVE checklist's "E" stands for:

A. Equipment readiness

B. External pressures

C. Engine performance

53. The DECIDE model is best described as:

A. A continuous loop for detecting changes and responding to them

B. A one-time pre-flight inspection

C. A weather-briefing request format

54. "Get-there-itis," a dangerous external pressure, is best resisted by:

A. Increasing speed to reach the destination sooner

B. Continuing despite warning signs

C. Being willing to divert, delay, or cancel

55. Convective currents on a warm, sunny day most commonly cause:

A. Smooth, stable air at low altitude

B. Low-altitude turbulence from rising thermals

C. Widespread layered clouds and steady rain

56. Mechanical turbulence is caused by:

A. Rising columns of warm air over heated surfaces

B. Wind flowing over obstructions such as buildings and terrain

C. The jet stream at high altitude

57. Freezing rain is an especially hazardous indicator because it implies:

A. Temperatures too cold for any icing

B. Dry, stable air ahead

C. Warmer air with supercooled droplets exists above the aircraft

58. The minimum visibility for the MVFR (marginal VFR) category, shown in blue, is:

A. Greater than 5 statute miles

B. 3 to 5 statute miles

C. Less than 1 statute mile

59. A pilot should realign the heading indicator with the magnetic compass during:

A. A standard-rate turn

B. Acceleration on takeoff

C. Straight-and-level, unaccelerated flight

60. Smoking and even mild altitude can degrade night vision beginning as low as approximately:

A. 18,000 feet MSL

B. 10,000 feet MSL

C. 5,000 feet MSL

Answer Key

1. B — Nitrogen makes up approximately 78% of the atmosphere, with oxygen comprising about 21% and other gases the remaining 1%. This composition is relatively constant throughout the lower atmosphere.

2. C — Nearly all weather occurs in the troposphere, the lowest atmospheric layer extending to an average of about 36,000 feet. Above it, the tropopause and stratosphere see far less weather activity.

3. B — The standard temperature lapse rate is approximately 2°C per 1,000 feet of altitude gained. This baseline underlies density-altitude calculations and performance planning.

4. C — Around a Northern Hemisphere high, air circulates clockwise and outward, with sinking air producing fair weather. A low, by contrast, circulates counterclockwise and inward with rising air.

5. A — Air that resists vertical motion and returns toward its original level when disturbed is stable. Stable air produces smooth conditions and layered clouds, while unstable air encourages vertical development.

6. C — The cumulonimbus is the thunderstorm cloud and the greatest aviation hazard, containing turbulence, lightning, hail, and severe wind shear. Other cloud types listed do not carry the same level of danger.

7. A — Radiation fog forms on clear, calm nights as the ground cools by radiation, chilling the air above it. It commonly forms in low-lying areas and burns off after sunrise.

8. A — Advection fog forms when warm, moist air moves over a cooler surface, often along coastlines, and it requires wind to develop. This distinguishes it from radiation fog, which needs calm conditions.

9. B — A warm front brings widespread layered (stratiform) clouds, steady precipitation, and low ceilings over a large area for an extended time. Its slow movement spreads poor conditions broadly.

10. A — A cold front moves fast and lifts air steeply, producing a narrow band of intense weather with rapid clearing behind it. This contrasts with the slow, widespread weather of a warm front.

11. B — The dew point is the temperature to which air must be cooled to become saturated, at which moisture condenses into visible form. A small temperature/dew-point spread signals air near saturation.

12. C — Unstable air encourages vertical motion, producing cumuliform clouds, showery precipitation, and turbulence, usually with good visibility between showers. Stable air instead yields smooth, layered conditions.

13. B — Structural icing requires both visible moisture and a temperature at or below freezing. Without both conditions present, ice will not accumulate on the airframe.

14. A — Clear ice forms from large supercooled droplets that flow back over the surface before freezing, creating a hard, heavy, glossy coating. It is the most dangerous icing type and the hardest to remove.

15. C — The mature stage features both updrafts and downdrafts coexisting with the heaviest precipitation, lightning, and greatest turbulence. The onset of rain reaching the surface marks this most violent phase.

16. B — Lenticular and rotor clouds near mountains are visual signs of mountain wave activity and severe turbulence. Strong wind blowing perpendicular to a ridge sets up these powerful waves.

17. C — A microburst's most dangerous feature on approach is the rapid change from a performance-increasing headwind to a performance-decreasing tailwind through a strong downdraft. This sudden loss of performance near the ground can be unrecoverable.

18. A — A METAR is an observation of current weather conditions at an airport, normally issued hourly. A forecast of expected conditions is provided by a TAF instead.

19. A — "BKN" (broken) indicates cloud coverage of 5 to 7 eighths of the sky. A broken or overcast layer constitutes a ceiling, while few and scattered layers do not.

20. C — A ceiling is the height of the lowest layer reported as broken or overcast, meaning more than half the sky is covered. Few and scattered layers are reported but do not form a ceiling.

21. C — A TAF forecasts weather within a 5-statute-mile radius of the airport. It is normally issued four times daily and valid for 24 or 30 hours.

22. A — "BECMG" (becoming) indicates a gradual change expected over a stated period. This differs from "FM," which signals a rapid change, and "TEMPO," which indicates brief fluctuations.

23. C — AIRMET Sierra provides information about IFR conditions and mountain obscuration. Tango covers turbulence and Zulu covers icing—each letter maps to a specific hazard.

24. C — A SIGMET warns of weather hazardous to all aircraft, whereas an AIRMET concerns hazards to light aircraft. SIGMETs cover more severe conditions like severe turbulence and icing.

25. A — A Convective SIGMET specifically addresses thunderstorm-related hazards, including embedded storms, squall lines, severe turbulence, hail, and wind shear. It is the most serious in-flight advisory.

26. B — A PIREP provides the most timely report of actual conditions encountered in flight, coming directly from an aircraft. It confirms or corrects forecasts with real observations.

27. B — A standard briefing provides the complete weather picture for a planned flight when no prior information has been received. An abbreviated briefing only updates a previous one.

28. C — An outlook briefing is appropriate when departure is six or more hours in the future, for planning purposes. It provides a general forecast rather than detailed current conditions.

29. C — Winds aloft in the forecast are referenced to true north. METAR winds in written reports are also true, while spoken ATIS and tower winds reference magnetic north.

30. B — In the winds-aloft forecast, "9900" indicates light and variable winds (less than 5 knots). It is a coding convention rather than an actual direction and speed.

31. C — Tightly spaced isobars indicate a steep pressure gradient and therefore stronger winds. Widely spaced isobars indicate a weak gradient and lighter winds.

32. A — The VFR category (green) requires a ceiling greater than 3,000 feet and visibility greater than 5 statute miles. Lower values fall into the MVFR, IFR, or LIFR categories.

33. A — A small temperature/dew-point spread indicates air near saturation, reliably signaling likely fog or low cloud formation. As the spread narrows toward zero, visible moisture becomes likely.

34. B — A temperature inversion traps moisture and pollutants beneath a warm layer, producing smooth but stable air with restricted visibility. The stable layer suppresses turbulence and convective clouds.

35. A — The four types of hypoxia are hypoxic, hypemic, stagnant, and histotoxic. Histotoxic hypoxia occurs when cells cannot use the available oxygen, as with alcohol or drugs.

36. C — Hypemic hypoxia, in which the blood cannot carry enough oxygen, can be caused by carbon monoxide poisoning, anemia, or blood loss. The oxygen-carrying capacity of the blood is reduced rather than the oxygen pressure.

37. A — One of the earliest and most insidious symptoms of hypoxia is euphoria and impaired judgment, which mask the danger. The victim often feels fine and fails to recognize the need for oxygen.

38. B — Hyperventilation produces dizziness, tingling, and lightheadedness that closely mimic hypoxia. Because the symptoms overlap, a pilot at altitude should address oxygen first if hypoxia is possible.

39. B — The corrective action for hyperventilation is to consciously slow the breathing rate and breathe normally, which restores carbon dioxide balance. Talking aloud also helps regulate breathing.

40. A — At night the central retina, rich in cones that need bright light, functions poorly, creating a night blind spot. Off-center viewing places the image on the rod-rich periphery, which sees better in darkness.

41. A — Full dark adaptation of the eyes takes approximately 30 minutes, during which the rods reach maximum sensitivity. Exposure to bright light can destroy this adaptation in an instant.

42. B — A narrower-than-usual runway creates the illusion of being too high, prompting a lower, potentially short approach. Cross-checking the VASI/PAPI and instruments counters the illusion.

43. C — The black-hole effect over dark, featureless terrain creates the illusion of being too high, prompting a dangerously low approach. The lack of visual cues leads the pilot to descend prematurely.

44. B — Spatial disorientation is best counteracted by trusting the flight instruments rather than misleading inner-ear sensations. Believing the instruments is essential when outside references are lost.

45. B — The "leans" results from an unnoticed slow roll, so when the pilot levels the wings it feels like banking the other way. It is the most common vestibular illusion and is countered by trusting the instruments.

46. A — The somatogravic illusion causes a rapid acceleration to feel like a nose-up pitch, tempting a dangerous nose-down correction. Trusting the attitude indicator prevents this error.

47. A — The IM SAFE checklist (Illness, Medication, Stress, Alcohol, Fatigue, Emotion) assesses the pilot's personal fitness for flight. It is a self-assessment as important as the aircraft checklist.

48. C — Decompression sickness can result from flying too soon after scuba diving, as residual nitrogen expands with increasing cabin altitude. Recommended wait times prevent the nitrogen from coming out of solution.

49. A — After a scuba dive requiring a controlled ascent, the recommended wait before flying is 24 hours. A non-decompression dive requires 12 hours before flying to cabin altitudes up to 8,000 feet.

50. A — The anti-authority attitude ("Don't tell me!") is countered by the antidote "Follow the rules; they are usually right." Recognizing the attitude allows the pilot to apply the antidote.

51. B — The resignation attitude ("What's the use?") is countered by "I'm not helpless; I can make a difference." This antidote restores the pilot's sense of agency in a difficult situation.

52. B — In the PAVE checklist, "E" stands for External pressures, such as the pressure to complete a flight. The other elements are Pilot, Aircraft, and enVironment.

53. A — The DECIDE model is a continuous loop—Detect, Estimate, Choose, Identify, Do, Evaluate—for responding to changes throughout a flight. It provides a structured process for in-flight decision-making.

54. C — Get-there-itis is best resisted by being willing to divert, delay, or cancel the flight for safety. The decision not to press on is always available and never wrong when made for safety.

55. B — Convective currents on a warm, sunny day cause low-altitude turbulence from rising thermals over unevenly heated surfaces. This bumpy air is common in the afternoon at low altitudes.

56. B — Mechanical turbulence is caused by wind flowing over obstructions such as buildings, terrain, and mountains, creating eddies downwind. Thermal turbulence, by contrast, comes from rising warm air.

57. C — Freezing rain implies that warmer air containing supercooled droplets exists above the aircraft, a serious hazard. The supercooled droplets freeze on contact, accumulating dangerous ice.

58. B — The MVFR (marginal VFR) category, shown in blue, includes visibility of 3 to 5 statute miles and/or ceilings of 1,000 to 3,000 feet. It lies between the VFR and IFR categories.

59. C — The heading indicator should be realigned with the magnetic compass during straight-and-level, unaccelerated flight, when the compass reads accurately. Turning or accelerating introduces compass errors.

60. C — Night vision can begin to degrade from mild altitude and smoking as low as approximately 5,000 feet MSL. This is why supplemental oxygen can improve night vision even at relatively low altitudes.