

PRACTICE EXAM 16 SIMULATION

1. Spatial disorientation is the inability to correctly interpret the aircraft's attitude, altitude, or airspeed in relation to:

- A. The aircraft's weight
- B. The Earth or a fixed point of reference
- C. The fuel remaining
- D. The radio frequency

2. The body's three sensory systems that contribute to orientation are the visual, vestibular, and:

- A. Auditory system alone
- B. Respiratory system
- C. Digestive system
- D. Postural (proprioceptive) system

3. Of the three orientation systems, the most reliable in flight is the:

- A. Visual system, when an external horizon or instruments are used
- B. Vestibular system
- C. Postural system
- D. Auditory system

4. The vestibular system, located in the inner ear, senses orientation using the:

- A. Cochlea and eardrum
- B. Optic nerve

- C. Pressure receptors in the skin
- D. Semicircular canals and otolith organs

5. The semicircular canals sense:

- A. Linear acceleration only
- B. Light intensity
- C. Sound frequency
- D. Angular acceleration about the aircraft's axes

6. The otolith organs sense:

- A. Linear acceleration and the pull of gravity
- B. Angular acceleration only
- C. Air pressure
- D. Magnetic heading

7. "The leans" is a form of spatial disorientation in which the pilot:

- A. Sees a false horizon
- B. Feels level while actually banked, or vice versa, after a slow roll goes unnoticed
- C. Loses all vision
- D. Experiences carbon monoxide poisoning

8. The leans most commonly results from:

- A. A rapid, well-perceived roll
- B. A slow roll into a bank that the vestibular system fails to detect

- C. Looking at the instruments
- D. Bright sunlight

9. A graveyard spiral occurs when a pilot in a prolonged turn loses the sensation of turning, levels the wings by feel, and:

- A. Re-enters the turn perceiving a turn in the opposite direction, tightening a descending spiral
- B. Climbs rapidly
- C. Recovers normally
- D. Experiences hyperventilation

10. The Coriolis illusion is produced by:

- A. Bright lights at night
- B. A steep descent
- C. A head movement during a prolonged turn, creating an overwhelming tumbling sensation
- D. Looking straight ahead

11. The somatogravic illusion causes a pilot to:

- A. Feel a turn that is not occurring
- B. Perceive a pitch-up (climb) during a rapid forward acceleration
- C. See a false horizon
- D. Lose night vision

12. During a rapid acceleration on takeoff, the somatogravic illusion may tempt the pilot to:

- A. Add power
- B. Bank steeply

- C. Reduce power only
- D. Push the nose down into a descent, believing the aircraft is pitching up

13. A rapid deceleration can produce a somatogavic illusion of:

- A. A turn
- B. A roll
- C. A pitch-down (dive), tempting the pilot to raise the nose
- D. Bright light

14. The inversion illusion occurs when an abrupt change from climb to straight-and-level flight creates the sensation of:

- A. A turn
- B. A descent
- C. Tumbling backward, tempting the pilot to push the nose down
- D. A normal climb

15. A false horizon illusion occurs when the pilot uses a:

- A. Sloping cloud bank or ground light pattern as a true horizon
- B. Properly functioning attitude indicator
- C. VOR radial
- D. DME readout

16. Autokinesis is a visual illusion in which:

- A. A stationary light, stared at in the dark, appears to move
- B. The horizon tilts

- C. The runway appears wider
- D. Vision is lost entirely

17. The single most effective way to prevent and overcome spatial disorientation is to:

- A. Rely on bodily sensations
- B. Trust and rely on the flight instruments
- C. Close the eyes
- D. Make large control inputs

18. A runway that is narrower than usual can create a landing illusion that the aircraft is:

- A. Lower than it actually is
- B. Higher than it actually is, tempting a lower-than-normal approach
- C. Faster than it is
- D. Banked

19. A runway that is wider than usual can create a landing illusion that the aircraft is:

- A. Lower than it actually is, tempting a higher-than-normal approach
- B. Higher than it is
- C. Slower than it is
- D. Off course laterally

20. An upsloping runway or terrain can create the illusion that the aircraft is:

- A. Lower than it is
- B. Banked

- C. Too slow
- D. Higher than it is, tempting a lower approach

21. A downsloping runway can create the illusion that the aircraft is:

- A. Higher than it is
- B. Banked
- C. Lower than it is, tempting a higher approach
- D. Too fast

22. The black-hole approach illusion occurs over:

- A. A brightly lit city
- B. A snow-covered field
- C. Featureless terrain or water at night, with the runway the only lights
- D. A daytime overcast

23. During a black-hole approach, the pilot tends to:

- A. Fly too high
- B. Bank excessively
- C. Add too much power
- D. Fly a lower-than-safe approach

24. Hypoxia is a condition resulting from:

- A. Excessive oxygen
- B. Carbon dioxide buildup only

- C. Too much cabin pressure
- D. Insufficient oxygen reaching the body's tissues

25. Hypemic hypoxia results from the blood's reduced ability to carry oxygen, a common cause being:

- A. High altitude alone
- B. Carbon monoxide poisoning
- C. Hyperventilation
- D. Bright sunlight

26. Hypoxic hypoxia, the type most associated with altitude, results from:

- A. Carbon monoxide
- B. Anemia
- C. A reduced partial pressure of oxygen at altitude
- D. Rapid breathing

27. Early symptoms of hypoxia include:

- A. Improved judgment
- B. Increased visual acuity
- C. Euphoria, impaired judgment, and cyanosis
- D. Sharpened reflexes

28. A particularly dangerous feature of hypoxia is that the affected pilot often experiences:

- A. A false sense of well-being, masking the impairment
- B. Immediate severe pain

- C. Loud ringing in the ears
- D. Sudden clear thinking

29. Hyperventilation, an abnormally rapid breathing rate, leads to:

- A. Excess oxygen poisoning
- B. Carbon monoxide buildup
- C. A blocked ear
- D. A reduction in carbon dioxide, causing dizziness and tingling

30. The treatment for hyperventilation is to:

- A. Breathe faster
- B. Increase altitude
- C. Slow the breathing rate and restore normal carbon dioxide levels
- D. Remove the oxygen mask

31. Carbon monoxide poisoning in an aircraft is most commonly associated with:

- A. A faulty exhaust manifold heater leaking into the cabin
- B. Excess oxygen
- C. High humidity
- D. Bright sunlight

32. A symptom of carbon monoxide poisoning is:

- A. Improved night vision
- B. Increased alertness

- C. Sharper hearing
- D. Headache, drowsiness, and dizziness

33. A pilot who smells exhaust fumes and feels a headache should suspect carbon monoxide and:

- A. Climb higher
- B. Continue normally
- C. Shut off the cabin heat, open fresh air vents, and use oxygen if available
- D. Reduce airspeed only

34. The "trust your instruments" principle is necessary because, in instrument conditions, the:

- A. Vestibular and postural senses become unreliable and produce false sensations
- B. Instruments are unreliable
- C. Visual system is enhanced
- D. Aircraft cannot be controlled

35. A pilot transitioning from VFR into clouds without an instrument scan is at high risk of:

- A. Improved orientation
- B. Spatial disorientation within seconds to minutes
- C. Carbon monoxide poisoning
- D. Hyperventilation only

36. The Coriolis illusion is best avoided by:

- A. Making frequent head movements
- B. Avoiding sudden head movements during turns and relying on instruments

- C. Closing the eyes
- D. Banking steeply

37. Middle ear and sinus pain during a descent (an ear or sinus block) is caused by:

- A. Hyperventilation
- B. Carbon monoxide
- C. Hypoxia
- D. A pressure differential that cannot equalize, often with congestion

38. Motion sickness in flight is caused by:

- A. Excess oxygen
- B. Carbon monoxide
- C. Low altitude
- D. Conflicting signals among the orientation senses

39. Decompression sickness, a risk after scuba diving and flying, is caused by:

- A. Carbon monoxide
- B. Nitrogen bubbles forming in the body at reduced pressure
- C. Excess oxygen
- D. Bright light

40. A pilot should wait an appropriate time after scuba diving before flying to:

- A. Improve night vision
- B. Reduce fuel

- C. Allow nitrogen to dissipate and avoid decompression sickness
- D. Increase oxygen

41. The most reliable cue for maintaining orientation in instrument meteorological conditions is the:

- A. Flight instruments
- B. Seat-of-the-pants feel
- C. Inner-ear sensation
- D. Sound of the engine

42. The IMSAFE checklist is used by a pilot to:

- A. Self-assess fitness for flight: Illness, Medication, Stress, Alcohol, Fatigue, Emotion/Eating
- B. Plan the fuel load
- C. Compute weight and balance
- D. Brief the approach

43. The "A" in the IMSAFE checklist stands for:

- A. Altitude
- B. Attitude
- C. Alcohol
- D. Airspeed

44. Regulations prohibit acting as a crewmember within how many hours of consuming alcohol (the "bottle to throttle" rule)?

- A. 8 hours
- B. 4 hours

- C. 12 hours
- D. 24 hours

45. Fatigue is a hazardous condition because it:

- A. Improves reaction time
- B. Sharpens judgment
- C. Has no effect on safety
- D. Degrades judgment, reaction time, and attention like other impairments

46. A pilot experiencing the leans should:

- A. Indulge the false sensation
- B. Make abrupt control inputs
- C. Rely on the attitude indicator and the other flight instruments
- D. Close the eyes and wait

47. Empty-field myopia is a visual condition in which the eyes, with nothing to focus on, relax to:

- A. Far focus
- B. Perfect distance focus
- C. A near focus of about 10 to 30 feet, reducing the ability to detect distant traffic
- D. Infinity focus

48. Night vision relies heavily on the rods of the eye, which are most concentrated:

- A. In the exact center of the visual field
- B. Off-center, so off-center viewing improves night detection

- C. Only in bright light
- D. In the optic nerve

49. To best detect an object at night, a pilot should use:

- A. Direct central focus
- B. Off-center (peripheral) viewing and scanning
- C. Bright cockpit lighting
- D. A single fixed gaze

50. Supplemental oxygen requirements for unpressurized aircraft require the flight crew to use oxygen above which cabin pressure altitude after 30 minutes?

- A. 12,500 feet MSL
- B. 10,000 feet MSL
- C. 8,000 feet MSL
- D. 5,000 feet MSL

51. Above 14,000 feet MSL cabin pressure altitude, the required flight crew must:

- A. Use oxygen only above 18,000 feet
- B. Use supplemental oxygen continuously
- C. Never use oxygen
- D. Use oxygen only for 30 minutes

52. Above 15,000 feet MSL cabin pressure altitude, supplemental oxygen must be:

- A. Used only by the pilot
- B. Used for 30 minutes only

- C. Avoided
- D. Provided to each occupant of the aircraft

53. A pilot can best combat the dangers of disorienting illusions on a night approach by:

- A. Relying on visual cues alone
- B. Cross-checking the flight instruments and using the VASI/PAPI
- C. Flying a steeper approach
- D. Disregarding the altimeter

54. Pressure vertigo, or alternobaric vertigo, is a spinning sensation caused by:

- A. Hypoxia
- B. Carbon monoxide
- C. Unequal pressure changes between the two middle ears, often during descent
- D. Hyperventilation

55. The reason vestibular illusions are so compelling is that the false sensations they produce:

- A. Are weak and easily ignored
- B. Occur only on the ground
- C. Feel completely real and can override what the instruments show
- D. Affect only night flight

56. A pilot recovering from a graveyard spiral must:

- A. Believe the instruments, level the wings by the attitude indicator, and stop the descent
- B. Follow the turning sensation

- C. Pull back hard while banked
- D. Close the eyes

57. A pilot flying into deteriorating weather and the onset of disorientation should:

- A. Continue VFR and look outside
- B. Transition to instruments immediately and, if not instrument-current, execute a 180-degree turn to exit
- C. Descend rapidly
- D. Increase speed and press on

58. The visual system can be deceived in flight when:

- A. The instruments are working
- B. The pilot uses peripheral vision
- C. An external horizon is clearly visible
- D. External references are absent or misleading, such as in clouds or at night

59. A pilot who is ill, even with a minor cold, should consider not flying because illness can:

- A. Improve focus
- B. Reduce fuel burn
- C. Cause ear blocks, impair judgment, and worsen with altitude
- D. Have no effect

60. The fundamental defense against all forms of spatial disorientation in instrument conditions is to:

- A. Establish and maintain a disciplined instrument cross-check, trusting the instruments over bodily sensation

- B. Rely on the vestibular system
- C. Use the postural sense
- D. Make large, frequent control inputs

Answer Key

1. B — Spatial disorientation is the inability to correctly interpret the aircraft's attitude, altitude, or airspeed in relation to the Earth or a fixed reference. It arises when the senses give false information.
2. D — The three orientation systems are the visual, vestibular, and postural (proprioceptive) systems. The postural system senses pressure on the body, the "seat of the pants."
3. A — The visual system is the most reliable in flight when an external horizon or the instruments are used. The vestibular and postural systems are easily fooled without visual reference.
4. D — The vestibular system uses the semicircular canals and otolith organs in the inner ear. These sense angular and linear acceleration respectively.
5. D — The semicircular canals sense angular acceleration about the aircraft's axes. They can be fooled by sustained turns, leading to illusions.
6. A — The otolith organs sense linear acceleration and the pull of gravity. They underlie the somatogravic illusion during acceleration.
7. B — The leans is feeling level while actually banked, or vice versa, after a slow roll goes unnoticed. The pilot may lean to match the false sensation.
8. B — The leans most commonly results from a slow roll into a bank that the vestibular system fails to detect. When the pilot notices and corrects, the abrupt correction feels like a bank the other way.
9. A — In a graveyard spiral, the pilot loses the turning sensation, levels by feel, then perceives a turn the opposite way and re-enters a tightening descending spiral. Believing the false sensation deepens the spiral.

10. C — The Coriolis illusion is produced by a head movement during a prolonged turn, creating an overwhelming tumbling sensation. It is among the most disorienting illusions.

11. B — The somatogravic illusion causes a pilot to perceive a pitch-up (climb) during a rapid forward acceleration. The otoliths interpret the acceleration as a nose-up attitude.

12. D — During rapid acceleration, the somatogravic illusion may tempt the pilot to push the nose down, believing the aircraft is pitching up. This can lead to a dangerous descent after takeoff.

13. C — A rapid deceleration produces a somatogravic illusion of a pitch-down (dive), tempting the pilot to raise the nose. This could lead to a stall.

14. C — The inversion illusion occurs when an abrupt change from climb to level flight creates the sensation of tumbling backward, tempting the pilot to push the nose down. The abrupt pitch change fools the otoliths.

15. A — A false horizon results from using a sloping cloud bank or ground light pattern as a true horizon. The pilot may align the aircraft with the false reference.

16. A — Autokinesis is a visual illusion in which a stationary light, stared at in the dark, appears to move. Avoiding a fixed stare prevents it.

17. B — The single most effective defense against spatial disorientation is to trust and rely on the flight instruments. The instruments give true information when the senses do not.

18. B — A narrower-than-usual runway creates the illusion of being higher than actual, tempting a lower-than-normal approach. The pilot may descend dangerously low.

19. A — A wider-than-usual runway creates the illusion of being lower than actual, tempting a higher-than-normal approach. The pilot may flare high or land long.

20. D — An upsloping runway or terrain creates the illusion of being higher than actual, tempting a lower approach. The slope deceives the pilot's perceived glidepath.

21. C — A downsloping runway creates the illusion of being lower than actual, tempting a higher approach. The downslope distorts the perceived approach angle.

22. C — The black-hole illusion occurs over featureless terrain or water at night, with the runway the only lights. The lack of visual cues distorts the approach.

23. D — During a black-hole approach, the pilot tends to fly a lower-than-safe approach. The absence of references makes the aircraft seem higher than it is.

24. D — Hypoxia results from insufficient oxygen reaching the body's tissues. It impairs judgment and performance, often without the pilot's awareness.

25. B — Hypemic hypoxia results from the blood's reduced oxygen-carrying ability, commonly from carbon monoxide poisoning. The CO binds hemoglobin, blocking oxygen transport.

26. C — Hypoxic hypoxia, the altitude type, results from a reduced partial pressure of oxygen at altitude. Less oxygen pressure means less crosses into the blood.

27. C — Early hypoxia symptoms include euphoria, impaired judgment, and cyanosis. The euphoria masks the danger.

28. A — A dangerous feature of hypoxia is a false sense of well-being that masks the impairment. The pilot may not recognize the deterioration.

29. D — Hyperventilation reduces carbon dioxide in the blood, causing dizziness, tingling, and visual disturbances. It can mimic hypoxia.

30. C — Hyperventilation is treated by slowing the breathing rate to restore normal carbon dioxide levels. Talking aloud or breathing into a bag helps.

31. A — Carbon monoxide poisoning is most commonly associated with a faulty exhaust manifold heater leaking into the cabin. The cabin heat draws air across the exhaust.

32. D — A symptom of carbon monoxide poisoning is headache, drowsiness, and dizziness. CO impairs the blood's oxygen-carrying capacity.

33. C — Suspecting carbon monoxide, the pilot should shut off the cabin heat, open fresh air vents, and use oxygen if available. Removing the source and getting fresh air is the response.

34. A — In instrument conditions, the vestibular and postural senses become unreliable and produce false sensations. This is why the instruments must be trusted.

35. B — A pilot entering clouds without an instrument scan risks spatial disorientation within seconds to minutes. The loss of the visual horizon leaves the unreliable inner-ear senses in control.

36. B — The Coriolis illusion is avoided by minimizing sudden head movements during turns and relying on instruments. Head movements during a turn trigger the tumbling sensation.

37. D — An ear or sinus block during descent is caused by a pressure differential that cannot equalize, often with congestion. The trapped pressure causes pain.

38. D — Motion sickness is caused by conflicting signals among the orientation senses. The mismatch between vision and the inner ear produces nausea.

39. B — Decompression sickness is caused by nitrogen bubbles forming in the body at reduced pressure. It is a risk when flying soon after scuba diving.

40. C — A pilot waits after scuba diving before flying to allow nitrogen to dissipate and avoid decompression sickness. Flying too soon risks bubble formation.

41. A — The most reliable orientation cue in IMC is the flight instruments. Seat-of-the-pants feel and inner-ear sensations are unreliable.

42. A — IMSAFE is a self-assessment of fitness: Illness, Medication, Stress, Alcohol, Fatigue, Emotion/Eating. It is a personal preflight checklist.
43. C — The "A" in IMSAFE stands for Alcohol. The checklist prompts the pilot to consider recent alcohol consumption.
44. A — Regulations prohibit acting as a crewmember within 8 hours of consuming alcohol ("8 hours bottle to throttle"). Other limits on blood alcohol also apply.
45. D — Fatigue degrades judgment, reaction time, and attention much like other impairments. It is a recognized hazard to safe flight.
46. C — A pilot experiencing the leans should rely on the attitude indicator and the other flight instruments. Indulging the false sensation or making abrupt inputs is dangerous.
47. C — Empty-field myopia occurs when the eyes, with nothing to focus on, relax to a near focus of about 10 to 30 feet, reducing distant-traffic detection. Deliberately focusing on distant objects counters it.
48. B — Night vision relies on the rods, which are concentrated off-center, so off-center viewing improves night detection. The central cones are poor in low light.
49. B — To detect an object at night, the pilot uses off-center (peripheral) viewing and scanning. Looking slightly to the side places the image on the rods.
50. A — In an unpressurized aircraft, the flight crew must use oxygen above 12,500 feet MSL cabin pressure altitude after 30 minutes. Between 12,500 and 14,000 the 30-minute allowance applies.
51. B — Above 14,000 feet MSL cabin pressure altitude, the required flight crew must use supplemental oxygen continuously. There is no time allowance above 14,000.

52. D — Above 15,000 feet MSL cabin pressure altitude, supplemental oxygen must be provided to each occupant. The crew requirement begins lower, but occupants are covered above 15,000.

53. B — On a night approach, the pilot combats disorienting illusions by cross-checking the flight instruments and using the VASI/PAPI. The instruments and glidepath aids counter the visual illusions.

54. C — Pressure (alternobaric) vertigo is a spinning sensation from unequal pressure changes between the two middle ears, often during descent. The pressure imbalance disturbs the vestibular system.

55. C — Vestibular illusions are compelling because the false sensations feel completely real and can override what the instruments show. This is why discipline to trust the instruments is essential.

56. A — Recovering from a graveyard spiral, the pilot must believe the instruments, level the wings by the attitude indicator, and stop the descent. Following the turning sensation deepens the spiral.

57. B — Facing disorientation in deteriorating weather, the pilot transitions to instruments immediately and, if not instrument-current, executes a 180-degree turn to exit. Returning to known good conditions is the safe response.

58. D — The visual system is deceived when external references are absent or misleading, such as in clouds or at night. Without a true horizon, illusions take over.

59. C — Illness, even a minor cold, can cause ear blocks, impair judgment, and worsen with altitude. The IMSAFE "I" prompts this consideration.

60. A — The fundamental defense against spatial disorientation in IMC is a disciplined instrument cross-check, trusting the instruments over bodily sensation. The instruments give truth when the senses lie.