

PRACTICE EXAM 9 (60 QUESTIONS)

1. An aircraft is cleared to descend from 11,000 feet to cross a fix at 6,000 feet. At a groundspeed of 150 knots and a descent rate of 500 fpm, approximately how far back must the descent begin?
 - A. About 15 nautical miles from the crossing fix
 - B. About 25 nautical miles from the crossing fix
 - C. About 35 nautical miles from the crossing fix
 - D. About 45 nautical miles from the crossing fix

2. A pilot must lose 3,000 feet in 6 nautical miles at a groundspeed of 120 knots. What rate of descent is required?
 - A. About 300 feet per minute for the descent segment
 - B. About 500 feet per minute for the descent segment
 - C. About 1,000 feet per minute for the descent segment
 - D. About 1,500 feet per minute for the descent segment

3. Under the regulations, what is the minimum visibility usually required to begin a standard instrument approach in a small aircraft?
 - A. There is no visibility requirement to begin any approach
 - B. Visibility must be at or above the published circling minimum
 - C. The visibility prescribed in the published approach procedure
 - D. At least three statute miles regardless of the approach type

4. An aircraft burns 10 gallons per hour and carries 48 usable gallons. Allowing a 45-minute IFR reserve, what is the maximum planning endurance to the destination?

- A. About 5 hours and 15 minutes of usable flight time
- B. About 4 hours and 45 minutes of usable flight time
- C. About 4 hours and 15 minutes of usable flight time
- D. About 4 hours and 0 minutes of usable flight time

5. What is the regulatory requirement for filing an IFR alternate using the standard rule?

- A. An alternate is required for every IFR flight without exception
- B. An alternate is required only when no approach is published
- C. Required unless ceiling 2,000 ft and visibility 3 sm at ETA window
- D. Required only when the destination lies above 5,000 feet elevation

6. A VOR radial of 090 is selected and the CDI shows a full-scale deflection to the left with a FROM flag. Where is the aircraft relative to the selected radial?

- A. The aircraft is positioned to the left of the 090 radial outbound
- B. The aircraft is right of the 090 radial, north of the eastbound course
- C. The aircraft is directly established on the centerline of the radial
- D. The aircraft is south of the radial, requiring a left correction

7. During an IFR flight in radar contact, when must a pilot report leaving an assigned altitude?

- A. Only when crossing a compulsory reporting fix along the route
- B. When vacating any previously assigned altitude for a new one
- C. Only after reaching the newly assigned target altitude in level flight
- D. Reports are never required while in continuous radar contact

8. An aircraft holds at 7,000 feet MSL. The published holding speed limit for this altitude is exceeded if the aircraft flies faster than what indicated airspeed?

- A. 200 knots indicated airspeed for this altitude band
- B. 175 knots indicated airspeed for this altitude band
- C. 230 knots indicated airspeed for this altitude band
- D. 265 knots indicated airspeed for this altitude band

9. A pilot intercepts a 12 DME arc around a VOR. To remain on the arc, what general technique is used?

- A. Fly a constant heading directly toward the VOR station center
- B. Maintain a steady bank angle throughout the entire arc segment
- C. Track a single radial continuously until reaching the approach fix
- D. Make small heading changes keeping the DME reading near 12

10. What does a "VOR receiver check" using a VOT facility require for IFR use?

- A. The indicated bearing must be within plus or minus 6 degrees
- B. The indication must read 0 TO or 180 FROM within 4 degrees
- C. The two receivers must agree within 10 degrees of each other
- D. The needle must center exactly with no flag on either radial

11. A flight plan shows an ETE of 2 hours 20 minutes and the aircraft burns 12 gph. Including the required 45-minute IFR reserve, how much fuel must be planned for the flight?

- A. About 24 gallons total for the planned IFR flight
- B. About 28 gallons total for the planned IFR flight
- C. About 32 gallons total for the planned IFR flight
- D. About 37 gallons total including the required reserve fuel

12. When cleared for an approach, when may the pilot descend to the initial published altitude?

- A. Only after crossing the final approach fix inbound on course
- B. As soon as the aircraft enters the destination's airspace
- C. Once established on a published segment of the approach
- D. After reporting the runway environment clearly in sight

13. An ILS glide slope is 3 degrees. At a groundspeed of 120 knots, approximately what descent rate maintains the glide path?

- A. About 320 feet per minute on the glide slope
- B. About 480 feet per minute on the glide slope
- C. About 800 feet per minute on the glide slope
- D. About 640 feet per minute on the glide slope

14. What is the significance of the term "MDA" on a non-precision approach?

- A. The altitude at which a precision decision to land is made
- B. The lowest altitude permitted without the required visual cues
- C. The altitude at which the missed approach climb must begin
- D. The highest altitude allowed during the final approach segment

15. A pilot is established in a standard-rate turn. How long will a 270-degree heading change take?

- A. About 90 seconds to complete the heading change
- B. About 60 seconds to complete the heading change
- C. About 45 seconds to complete the heading change
- D. About 120 seconds to complete the heading change

16. Under IFR, what is required regarding the aircraft's transponder in most controlled airspace?

- A. It must be turned off when operating below 10,000 feet MSL
- B. It is optional as long as the aircraft is in radar contact
- C. It must operate on the standard VFR code at all times
- D. It must be operating with altitude reporting (Mode C) enabled

17. A pilot flying at 165 knots groundspeed needs to determine time to a fix 22 NM away. Approximately how long will it take?

- A. About 8 minutes to reach the fix at that groundspeed
- B. About 12 minutes to reach the fix at that groundspeed
- C. About 15 minutes to reach the fix at that groundspeed
- D. About 5 minutes to reach the fix at that groundspeed

18. What does the term "cleared for the visual approach" require of the pilot?

- A. The pilot must execute the full published instrument procedure
- B. The pilot maintains visual reference to the airport or preceding traffic
- C. The pilot may descend below MDA without any visual contact
- D. The pilot must remain on the localizer until the runway threshold

19. An aircraft must cross a fix at 4,000 feet while descending from 9,000 feet at 600 fpm and a groundspeed of 180 knots. How far out should descent begin?

- A. About 10 nautical miles from the crossing fix
- B. About 18 nautical miles from the crossing fix
- C. About 22 nautical miles from the crossing fix
- D. About 25 nautical miles from the crossing fix

20. What is required for currency to act as PIC under IFR carrying passengers?

- A. A flight review completed within the preceding 12 calendar months
- B. A minimum of 50 hours of cross-country pilot-in-command time
- C. A current second-class medical certificate held by the pilot
- D. Six approaches, holding, and tracking within six calendar months

21. A pilot wants to maintain a 3-degree descent path and uses the rule of thumb of multiplying groundspeed by 5. At 140 knots, what is the target rate?

- A. About 560 feet per minute on the descent path
- B. About 700 feet per minute on the descent path
- C. About 420 feet per minute on the descent path
- D. About 840 feet per minute on the descent path

22. What does ATC mean by the instruction "maintain 5,000, expect 9,000 in 10 minutes"?

- A. Climb immediately to 9,000 and report reaching that altitude
- B. Hold 5,000 now; 9,000 is the lost-comm altitude after the time
- C. Descend to 5,000 and remain there until receiving a new clearance
- D. Begin a gradual climb so as to reach 9,000 in exactly 10 minutes

23. During a partial-panel timed turn to a heading, what instrument provides the turn rate reference?

- A. The turn coordinator indicating the rate of the turn
- B. The attitude indicator showing the precise bank angle
- C. The heading indicator showing the magnetic heading change
- D. The magnetic compass read continuously throughout the turn

24. An aircraft is 30 NM from the VOR with a groundspeed of 120 knots. How long until station passage?

- A. About 15 minutes to reach the VOR station
- B. About 20 minutes to reach the VOR station
- C. About 25 minutes to reach the VOR station
- D. About 10 minutes to reach the VOR station

25. What is the purpose of the "minimum vectoring altitude" used by controllers?

- A. The lowest altitude at which a pilot may request a visual approach
- B. The altitude below which the transponder must report mode C data
- C. The lowest altitude ATC may assign that ensures obstacle clearance
- D. The altitude above which radar contact is automatically guaranteed

26. A pilot flying a published missed approach must do what first at the missed approach point?

- A. Immediately turn toward the holding fix for the missed procedure
- B. Descend to the circling minimum and search for the runway again
- C. Contact approach control before initiating any climb or turn
- D. Climb on the prescribed track as published before turning

27. An aircraft covers 16 NM in 8 minutes. What is its groundspeed?

- A. About 100 knots based on the distance and time flown
- B. About 140 knots based on the distance and time flown
- C. About 120 knots based on the distance and time flown
- D. About 160 knots based on the distance and time flown

28. What does the regulation require if both the destination and alternate weather are forecast below minimums?

- A. The flight may not be legally dispatched under instrument rules
- B. The flight may proceed if extra fuel reserves are carried aboard
- C. The flight may depart but must hold until conditions improve
- D. The pilot may substitute a VFR flight plan for the IFR plan

29. A 3-degree glide slope is being flown. Approximately how much altitude is lost per nautical mile?

- A. About 200 feet of altitude lost per nautical mile flown
- B. About 320 feet of altitude lost per nautical mile flown
- C. About 500 feet of altitude lost per nautical mile flown
- D. About 100 feet of altitude lost per nautical mile flown

30. What is the meaning of a "cruise" clearance issued by ATC?

- A. It authorizes any altitude from the minimum IFR up to the assigned level
- B. It requires the aircraft to maintain exactly the assigned cruising altitude
- C. It prohibits any approach until a separate clearance is issued
- D. It restricts the aircraft to VFR-on-top operations only en route

31. A pilot computes a required climb gradient of 200 feet per nautical mile at a groundspeed of 90 knots. What rate of climb is needed?

- A. About 200 feet per minute to meet the climb gradient
- B. About 240 feet per minute to meet the climb gradient
- C. About 300 feet per minute to meet the climb gradient
- D. About 450 feet per minute to meet the climb gradient

32. What does the term "radar contact" from ATC establish?

- A. ATC has identified the aircraft and is providing radar monitoring
- B. The pilot is relieved of all position-reporting responsibilities permanently
- C. The aircraft is cleared to descend at the pilot's own discretion
- D. The pilot may cancel the IFR flight plan automatically at any time

33. An aircraft holds with a one-minute inbound leg. With a 20-knot headwind on the inbound leg, the outbound leg timing should be what?

- A. Lengthened beyond one minute to compensate for the headwind
- B. Shortened below one minute to compensate for the headwind
- C. Held at exactly one minute regardless of the wind component
- D. Adjusted only by changing the holding airspeed, not the timing

34. What does the symbol "(IAF)" denote on an approach chart?

- A. The point where the final approach descent must begin
- B. The fix marking the missed approach holding pattern entry
- C. The location of the primary navaid serving the approach
- D. The initial approach fix where an approach segment begins

35. A pilot needs to descend 5,000 feet and wants to arrive at the fix in 10 minutes. What average descent rate is required?

- A. About 500 feet per minute over the ten-minute descent
- B. About 750 feet per minute over the ten-minute descent
- C. About 1,000 feet per minute over the ten-minute descent
- D. About 250 feet per minute over the ten-minute descent

36. What is the primary purpose of an instrument approach's "missed approach segment"?

- A. To provide a safe climb and route when landing cannot be completed
- B. To allow a second immediate descent attempt to the same runway
- C. To transition the aircraft directly onto the en route airway structure
- D. To establish the circling maneuver around the destination airport

37. An aircraft's true airspeed is 150 knots with a 30-knot direct headwind. What is the groundspeed?

- A. About 180 knots accounting for the wind component
- B. About 120 knots accounting for the wind component
- C. About 150 knots accounting for the wind component
- D. About 90 knots accounting for the wind component

38. What does "lost communications" procedure specify for the route to fly under IFR in IMC?

- A. Fly the most direct available route to the nearest VFR airport
- B. Fly the assigned, vectored, expected, or filed route in that order
- C. Maintain the last assigned heading until reaching the destination
- D. Squawk emergency and descend immediately below the cloud layer

39. A pilot flying at 8,000 feet receives an altimeter setting change from 30.12 to 29.92. What happens to the indicated altitude after resetting?

- A. The indicated altitude increases by approximately 200 feet
- B. The indicated altitude remains exactly the same as before
- C. The indicated altitude increases by approximately 400 feet
- D. The indicated altitude decreases by approximately 200 feet

40. What is the maximum allowable error for an IFR-certified altimeter when compared to a known field elevation?

- A. The altimeter may differ by up to 100 feet from field elevation
- B. The altimeter must match the field elevation with no tolerance
- C. The altimeter should read within 75 feet of the field elevation
- D. The altimeter may differ by up to 200 feet from field elevation

41. An aircraft on a 10 DME arc maintains the arc by keeping the VOR bearing pointer where relative to the wingtip?

- A. Roughly 10 degrees ahead of the wingtip reference position
- B. Directly on the nose pointing toward the VOR station center
- C. Near the wingtip reference, adjusting with small turns inward
- D. Roughly 30 degrees behind the wingtip reference position

42. What is the purpose of the "minimum reception altitude" (MRA) on an airway?

- A. The lowest altitude where an intersection can be reliably received
- B. The lowest altitude guaranteeing terrain clearance along the route
- C. The highest altitude permitted before requiring an IFR clearance
- D. The altitude at which radar coverage is automatically assured

43. A pilot descends at 740 fpm with a groundspeed of 140 knots. Approximately what is the descent angle being flown?

- A. About a 1-degree descent angle along the flight path
- B. About a 5-degree descent angle along the flight path
- C. About a 2-degree descent angle along the flight path
- D. About a 3-degree descent angle along the flight path

44. What is required before an instrument-rated pilot may file and fly IFR in controlled airspace?

- A. A current first-class medical certificate held by the pilot
- B. At least 100 hours of pilot-in-command cross-country time
- C. Filing a VFR flight plan and obtaining a special VFR clearance
- D. An ATC clearance obtained prior to operating under instrument rules

45. An aircraft must lose 6,000 feet and is 20 NM from the fix at 150 knots groundspeed. What descent rate is needed?

- A. About 750 feet per minute to meet the crossing restriction
- B. About 500 feet per minute to meet the crossing restriction
- C. About 1,000 feet per minute to meet the crossing restriction
- D. About 1,200 feet per minute to meet the crossing restriction

46. What is the significance of a "feeder route" on an instrument approach chart?

- A. It defines the final descent profile to the runway threshold
- B. It connects the en route structure to an initial approach fix
- C. It marks the missed approach climb gradient requirement
- D. It establishes the circling protected area boundary limits

47. When ATC clears an aircraft to "hold as published," what defines the holding pattern?

- A. The holding pattern depicted on the chart for that fix
- B. The pilot's own discretion in selecting a holding direction
- C. A standard right-turn pattern regardless of the chart depiction
- D. The last assigned heading extended outbound from the fix

48. A pilot flying a 90-knot groundspeed needs to cover 3 NM. How long will it take?

- A. About 1 minute to cover the three-mile distance
- B. About 3 minutes to cover the three-mile distance
- C. About 2 minutes to cover the three-mile distance
- D. About 4 minutes to cover the three-mile distance

49. What does the "circling approach" minimum permit a pilot to do?

- A. Conduct a straight-in landing aligned with the final course
- B. Descend below the published decision height on a precision approach
- C. Continue an approach with visibility below the published minimum
- D. Maneuver visually to land on a runway not aligned with the approach

50. An aircraft is climbing at 500 fpm with a groundspeed of 120 knots. What is the approximate climb gradient per nautical mile?

- A. About 150 feet gained per nautical mile in the climb
- B. About 200 feet gained per nautical mile in the climb
- C. About 250 feet gained per nautical mile in the climb
- D. About 350 feet gained per nautical mile in the climb

51. What does the term "VFR-on-top" clearance permit an IFR pilot to do?

- A. Cancel the IFR flight plan and proceed without any clearance
- B. Operate at VFR altitudes above a cloud layer while on an IFR plan
- C. Descend below the clouds whenever the pilot chooses to do so
- D. Disregard the assigned altitude and climb at the pilot's discretion

52. A pilot must determine top-of-descent for a 4,000-foot descent at 500 fpm and 120 knots groundspeed. How far back is it?

- A. About 12 nautical miles from the target crossing point
- B. About 16 nautical miles from the target crossing point
- C. About 20 nautical miles from the target crossing point
- D. About 8 nautical miles from the target crossing point

53. What information does a "STAR" provide to an IFR pilot?

- A. A departure procedure routing aircraft away from the airport
- B. A published instrument approach to a specific runway end
- C. A standard arrival route transitioning to the approach phase
- D. A holding pattern reserved for weather delays near the field

54. An altimeter is set to 29.92 instead of the local setting of 30.22. How does this affect the indicated altitude?

- A. The indicated altitude reads higher than the true altitude
- B. The indicated altitude exactly matches the true altitude
- C. The indicated altitude is unaffected by the setting difference
- D. The indicated altitude reads lower than the true altitude

55. What does the regulation require for an IFR flight plan in controlled airspace?

- A. The pilot may proceed once airborne and contact ATC en route
- B. The pilot must remain clear of clouds until receiving a clearance
- C. A clearance must be received before entering controlled airspace IFR
- D. A VFR flight plan must be filed and converted once aloft

56. A pilot needs a 3-degree approach path and is 5 NM from the runway. What is the approximate altitude above the runway?

- A. About 1,000 feet above the runway at five miles out
- B. About 1,200 feet above the runway at five miles out
- C. About 1,600 feet above the runway at five miles out
- D. About 800 feet above the runway at five miles out

57. What does the term "DA" denote on an approach with vertical guidance?

- A. The lowest altitude permitted during a circling maneuver
- B. The altitude at which an aircraft levels for the final segment
- C. The fix where the final approach course is first intercepted
- D. The altitude where a decision to land or go missed is made

58. An aircraft groundspeed is 144 knots. How far does it travel in 5 minutes?

- A. About 8 nautical miles in the five-minute interval
- B. About 12 nautical miles in the five-minute interval
- C. About 16 nautical miles in the five-minute interval
- D. About 20 nautical miles in the five-minute interval

59. What is the purpose of the "minimum crossing altitude" (MCA) at a fix?

- A. The lowest altitude to cross a fix when proceeding to higher terrain
- B. The highest altitude permitted when crossing the designated fix
- C. The altitude at which radar service begins along the airway
- D. The altitude reserved for holding at the designated intersection

60. A pilot flying at 130 knots groundspeed wants to descend 2,600 feet over 10 NM. What rate of descent is needed?

- A. About 350 feet per minute for the planned descent
- B. About 450 feet per minute for the planned descent
- C. About 560 feet per minute for the planned descent
- D. About 700 feet per minute for the planned descent

+ Answer Key

1. B — Descending 5,000 ft at 500 fpm takes 10 minutes; at 150 knots (2.5 NM per minute) the aircraft covers 25 NM. Top-of-descent must therefore begin about 25 NM before the fix. Early descent planning prevents a rushed, unstable arrival at the crossing restriction.
2. C — Losing 3,000 ft in 6 NM at 120 knots gives 3 minutes available ($6 \text{ NM} \div 2 \text{ NM/min}$), requiring 1,000 fpm. The descent rate equals altitude to lose divided by time available. This is a steep descent that warrants early planning and power management.
3. C — An approach is begun using the visibility prescribed in the published procedure, which varies by approach type and category. Visibility, not ceiling, is the controlling factor for commencing the approach under the regulations. The specific minimum is printed on the approach plate.
4. D — At 10 gph, 48 usable gallons yields 4.8 hours (4 h 48 min); subtracting the 45-minute IFR reserve leaves about 4 hours 3 minutes, rounding to roughly 4 hours of planning endurance. Reserves must be deducted before computing usable time to a destination. Planning to dry tanks is never acceptable under IFR.
5. C — Under the standard 1-2-3 rule, an alternate is required unless the destination forecast shows at least a 2,000-foot ceiling and 3 statute miles visibility from one hour before to one hour after the ETA. Meeting both relieves the alternate requirement. Falling short of either triggers the need to file an alternate.
6. B — With the 090 radial selected, a FROM flag, and a full left CDI deflection, the aircraft is right of the eastbound 090 course, which places it north of that radial. The needle indicates the course lies to the left of the aircraft's position. Correcting left would re-intercept the selected radial.

7. B — In radar contact, a pilot still reports vacating any previously assigned altitude for a newly assigned one. This altitude report is a required item even under radar service. It keeps ATC's altitude picture accurate during the transition.

8. A — At 7,000 ft MSL the maximum holding airspeed is 200 knots indicated for that altitude band, so exceeding 200 KIAS exceeds the limit. Holding speed limits keep the aircraft within protected airspace. Higher limits apply only at higher altitude bands.

9. D — A DME arc is maintained by making small heading changes to keep the DME readout near the target distance, here 12 NM. The technique is a series of short straight segments approximating the curve. Continuous small corrections hold the constant radius.

10. B — A VOT check requires the receiver to indicate 0° with a FROM flag or 180° with a TO flag, within ± 4 degrees, to be acceptable for IFR. The VOT transmits a fixed omnidirectional 360° signal. Any greater error renders the receiver unusable for IFR navigation.

11. D — An ETE of 2 h 20 min (140 min) at 12 gph burns 28 gallons of trip fuel; adding a 45-minute reserve of 9 gallons gives 37 gallons total. The reserve must always be added on top of trip fuel, never counted within it. Planning to less than legal reserves is prohibited under IFR..

12. C — A pilot may descend to a published altitude once the aircraft is established on a published segment of the approach. Being on a charted route or fix authorizes the associated minimum altitude. Descending before being established risks terrain or obstacle conflict.

13. D — At 120 knots a 3-degree glide slope requires roughly 640 fpm (a useful estimate is $\text{groundspeed} \times 5 \approx 600$, refined by the exact tangent to about 637 fpm). The descent rate scales with groundspeed on a fixed-angle path. Faster groundspeeds demand proportionally higher descent rates.

14. B — MDA (Minimum Descent Altitude) is the lowest altitude permitted on a non-precision approach without the required visual references in sight. Unlike a decision altitude, it is a level-off floor, not a point of continued descent. Descent below it requires seeing the runway environment.

15. A — At the standard turn rate of 3 degrees per second, a 270-degree heading change takes 90 seconds ($270 \div 3$). Standard-rate timing underlies partial-panel and holding maneuvers. Knowing the rate lets a pilot roll out accurately by time.

16. D — Under IFR in most controlled airspace the transponder must operate with Mode C altitude reporting. Altitude encoding enables vertical separation in the radar environment. It is a baseline equipment requirement for the airspace involved.

17. A — At 165 knots a 22 NM distance takes about 8 minutes ($22 \div 165 \times 60 \approx 8$). Time equals distance divided by groundspeed. Quick time-distance estimates support fix and descent planning.

18. B — A visual approach clearance requires the pilot to maintain visual reference to the airport or to preceding traffic being followed. It is an IFR procedure conducted visually, reducing controller workload. The pilot accepts responsibility for visual separation and terrain clearance.

19. D — Descending 5,000 ft at 600 fpm takes about 8.3 minutes; at 180 knots (3 NM per minute) that covers roughly 25 NM. The descent must begin about 25 NM out to meet the crossing altitude. Planning the top-of-descent avoids a rushed, steep arrival.

20. D — IFR currency to carry passengers requires six instrument approaches, holding, and intercepting/tracking courses within the preceding six calendar months. These recency tasks maintain instrument proficiency. A lapse requires regaining currency or completing an instrument proficiency check.

21. B — Using the rule of thumb of groundspeed $\times 5$, a 140-knot groundspeed yields a target of 700 fpm for a 3-degree path. The multiplier approximates the descent rate for a standard glide path. It is a quick mental tool for setting descent rate.

22. B — "Maintain 5,000, expect 9,000 in 10 minutes" means hold 5,000 now; the 9,000 is the altitude to use for lost-communications planning after the stated time. It is an expectation, not a clearance to climb immediately. The "expect" altitude becomes the NORDO altitude if radios fail.

23. A — During a partial-panel timed turn, the turn coordinator supplies the rate-of-turn reference because the gyroscopic attitude and heading indicators may be lost. A standard-rate turn timed by the clock yields the desired heading change. The turn coordinator is the key surviving instrument.

24. A — At 120 knots, 30 NM to the VOR takes 15 minutes ($30 \div 120 \times 60$). Time equals distance over groundspeed. Such estimates help anticipate station passage and sequencing.

25. C — The minimum vectoring altitude is the lowest altitude ATC may assign while vectoring that still ensures obstacle clearance. It is a controller tool not published on charts. It guarantees terrain separation during radar vectors.

26. D — At the missed approach point the pilot first climbs on the prescribed track as published before any turn. Climbing initiates obstacle protection along the missed approach path. Premature turns can void the protected area's clearance.

27. C — Covering 16 NM in 8 minutes equals 2 NM per minute, which is 120 knots. Groundspeed equals distance divided by time, scaled to an hour. This quick check supports navigation and fuel planning.

28. A — If both destination and alternate are forecast below minimums, the flight may not be legally dispatched under IFR. The regulations require a usable alternate when one is needed. Carrying extra fuel does not cure an illegal weather situation.

29. B — A 3-degree path loses about 318 feet per nautical mile, rounding to roughly 320 ft/NM. This comes from 6,076 ft per NM times the tangent of 3 degrees. It is a handy figure for cross-checking approach descent profiles.

30. A — A cruise clearance authorizes the pilot to fly at any altitude from the minimum IFR altitude up to and including the assigned level, and to make an approach at the destination. It grants block-altitude flexibility. It is common in low-traffic or non-radar environments.

31. C — A 200 ft/NM gradient at 90 knots (1.5 NM per minute) requires 300 fpm (200×1.5). Climb rate equals gradient times groundspeed in NM per minute. This converts a charted gradient into a usable vertical-speed target.

32. A — "Radar contact" means ATC has identified the aircraft and is providing radar monitoring of its flight. It does not eliminate all reporting duties or grant descent discretion. It informs the pilot that radar service has begun.

33. A — With a 20-knot headwind on the inbound leg, the outbound leg must be lengthened beyond one minute so the wind-aided inbound leg still totals one minute. Timing adjustments compensate for wind to keep the pattern within protected airspace. Outbound time is tuned to achieve the target inbound time.

34. D — "(IAF)" marks the initial approach fix, where an approach segment begins. It is the entry point from the feeder or en route structure into the approach. Multiple IAFs may serve a single approach procedure.

35. A — Losing 5,000 ft in 10 minutes requires an average descent of 500 fpm ($5,000 \div 10$). Rate equals altitude divided by available time. This sets the vertical-speed target for the planned arrival.

36. A — The missed approach segment provides a safe climb and defined route when a landing cannot be completed. It guarantees obstacle clearance during the go-around and transition to holding. It is an integral, protected part of every instrument approach.

37. B — A 150-knot true airspeed with a 30-knot direct headwind yields a 120-knot groundspeed ($150 - 30$). A headwind subtracts directly from airspeed to give groundspeed. This reduces progress and increases fuel and time for the leg.

38. B — Lost-communications routing in IMC follows the order: assigned, then vectored, then expected, then filed route (the "AVEF" memory aid). This sequence defines the route to fly when radios fail. It ensures predictability for ATC separation.

39. D — Resetting from 30.12 to 29.92 lowers the setting by 0.20 inHg, so the indicated altitude decreases by about 200 feet ($\approx 1,000 \text{ ft per inch} \times 0.20$). Lowering the Kollsman setting lowers the indicated reading. The aircraft's true altitude is unchanged by the reset.

40. A — An IFR-certified altimeter is acceptable if it reads within 100 feet of the known field elevation. Greater error makes it unsuitable for IFR use. This check verifies altitude accuracy critical to vertical separation.

41. C — To maintain a DME arc, the VOR bearing pointer is kept near the wingtip reference, with small turns inward when it falls behind. Keeping the pointer at the wingtip holds a track perpendicular to the station, preserving the radius. Small corrections maintain the constant distance.

42. A — The minimum reception altitude (MRA) is the lowest altitude at which an intersection or fix can be reliably received from the relevant nav aids. It is published where signal coverage, not terrain, is the limiting factor. Flying below it risks losing the fix identification.

43. D — At 140 knots the aircraft covers about 14,177 feet per minute over the ground; a 740 fpm descent gives a path angle of $\arctangent(740 \div 14,177) \approx 3$ degrees. This is the standard glide path angle for a stabilized approach. Matching descent rate to groundspeed holds the desired angle.

44. D — Before flying IFR in controlled airspace, the pilot must obtain an ATC clearance prior to operating under instrument rules. The clearance authorizes the route, altitude, and entry into the system. Operating IFR without a clearance in controlled airspace is prohibited.

45. A — Losing 6,000 ft over 20 NM at 150 knots gives 8 minutes available ($20 \div 150 \times 60$), requiring 750 fpm ($6,000 \div 8$). Rate equals altitude to lose divided by time available. Early planning keeps the descent stabilized.

46. B — A feeder route connects the en route structure to an initial approach fix. It provides a charted transition with headings, distances, and altitudes into the approach. It bridges the airway system and the approach procedure.

47. A — "Hold as published" means flying the holding pattern exactly as depicted on the chart for that fix. The charted depiction defines turn direction, leg lengths, and inbound course. The pilot need not be issued the full holding instructions verbally.

48. C — At 90 knots, 3 NM takes 2 minutes ($3 \div 90 \times 60$). Time equals distance divided by groundspeed. Short time-distance computations aid fix and descent timing.

49. D — A circling minimum permits maneuvering visually to land on a runway not aligned with the final approach course. It applies when a straight-in landing is impractical. Maneuvering must remain within the protected circling area at or above the circling MDA.

50. C — Climbing at 500 fpm with a 120-knot groundspeed (2 NM per minute) gives 250 feet gained per nautical mile ($500 \div 2$). Gradient equals climb rate divided by groundspeed in NM per minute. This converts vertical speed into a per-mile gradient.

51. B — A VFR-on-top clearance lets an IFR pilot operate at VFR altitudes above a cloud layer while remaining on the IFR flight plan. The pilot complies with VFR cruising altitudes and cloud clearances while retaining IFR status. ATC must approve it and it is not permitted in Class A airspace.

52. B — Descending 4,000 ft at 500 fpm takes 8 minutes; at 120 knots (2 NM per minute) that covers 16 NM. Top-of-descent is therefore about 16 NM before the target. Computing it ensures a timely, stabilized descent.

53. C — A STAR (Standard Terminal Arrival Route) is a published arrival procedure transitioning aircraft from the en route structure toward the approach phase. It standardizes and simplifies arrival routings into busy terminal areas. It reduces radio congestion and controller workload.

54. D — Setting 29.92 when the local setting is 30.22 uses a value 0.30 inHg too low, so the indicated altitude reads about 300 feet lower than true altitude. A lower-than-actual setting produces a lower indication. The aircraft is actually higher than the altimeter shows.

55. C — Operating IFR in controlled airspace requires a clearance to be received before entering that airspace under instrument rules. The clearance establishes route, altitude, and separation. Entering IFR without it is not permitted.

56. C — On a 3-degree path at 5 NM, the aircraft is about 1,600 feet above the runway ($\approx 318 \text{ ft/NM} \times 5$). The 3-degree path equates to roughly 300+ feet of height per mile. This gives a quick altitude cross-check on final.

57. D — DA (Decision Altitude) on an approach with vertical guidance is the altitude where the pilot decides to land or execute the missed approach. The decision depends on having the required visual references. It applies to precision and approach-with-vertical-guidance procedures.

58. B — At 144 knots the aircraft travels 12 NM in 5 minutes ($144 \div 60 \times 5$). Distance equals groundspeed in NM per minute times time. This supports fix timing and position estimates.

59. A — The minimum crossing altitude (MCA) is the lowest altitude at which a fix may be crossed when proceeding toward higher minimum altitudes or terrain. It ensures the aircraft begins a climb early enough for obstacle clearance ahead. It is charted where a higher altitude is needed beyond the fix.

60. C — Descending 2,600 ft over 10 NM at 130 knots gives about 4.6 minutes available, requiring roughly 560 fpm ($2,600 \div 4.6$). Rate equals altitude to lose divided by time available. This sets the descent target to meet the restriction.