PRACTICE EXAM 33 (60 QUESTIONS)

1. What is the defining characteristic of a stable air mass?

A. Cumuliform clouds, good visibility, and turbulent vertical currents

B. Stratiform clouds, poor visibility, and smooth steady precipitation

C. Towering cumulus, showery precipitation, and excellent visibility

D. Clear skies, gusty surface winds, and rapidly building cumulus

2. What causes the development of a cold front's typically narrow band of weather?

A. Cold dense air rapidly undercutting and lifting the warmer air mass

B. Warm air gradually overrunning a retreating cold air mass aloft

C. Two air masses of equal temperature meeting with no vertical motion

D. Warm moist air slowly descending behind the frontal boundary line

3. What weather is most associated with a warm front?

A. A narrow band of thunderstorms and severe low-level turbulence

B. Sudden clearing with gusty winds immediately behind the boundary

C. Rapidly building cumulus and showery precipitation along the front

D. Widespread stratiform clouds and prolonged steady precipitation

4. What does a stationary front indicate about the two air masses involved?

A. Neither air mass has enough force to displace the other significantly

B. One air mass is rapidly overtaking and lifting the other air mass

C. Both air masses are descending and producing widespread clearing

D. The warm air mass is aggressively undercutting the colder air mass

5. What is the primary requirement for thunderstorm formation?

A. A stable air mass with a strong low-level temperature inversion

B. Unstable air, a lifting force, and sufficient moisture in the air

C. Clear skies, calm winds, and a strong high-pressure ridge aloft

D. Descending dry air over a cold and stable surface boundary layer

6. What are the three stages of a thunderstorm's life cycle in order?

A. Cumulus, mature, and dissipating stages of development

B. Developing, severe, and weakening stages of the storm

C. Building, peak, and collapsing stages of the storm cell

D. Initial, active, and final stages of the convective process

7. During which thunderstorm stage are downdrafts and the strongest hazards present?

A. The mature stage, when updrafts and downdrafts coexist violently

B. The cumulus stage, when only updrafts dominate the developing cell

C. The dissipating stage, when downdrafts have weakened considerably

D. The initial stage, before any precipitation has begun to fall

8. What is a microburst and why is it especially hazardous to aircraft?

A. A slow steady downdraft that gradually pushes aircraft toward terrain

B. A wide circular wind pattern around a stationary low-pressure center

C. A small intense downdraft producing severe low-level wind shear

D. A high-altitude clear-air disturbance affecting only jet traffic

9. What does the presence of standing lenticular clouds signify?

A. An approaching warm front bringing widespread steady precipitation

B. Stable moist air producing extensive low stratus cloud layers

C. Mountain wave activity with possible severe turbulence aloft

D. Calm stable conditions with no significant wind at any altitude

10. What type of icing forms from large supercooled droplets that spread before freezing?

A. Clear ice, which is dense, hard, and difficult to remove

B. Rime ice, which is rough, opaque, and relatively brittle

C. Frost, which forms by deposition on a cold airframe surface

D. Mixed ice, which is a uniform blend of frost and granular ice

11. What conditions produce rime ice on an aircraft in flight?

A. Large supercooled droplets spreading along the wing before freezing

B. Rain falling through a layer of warmer air aloft before reaching the wing

C. Small supercooled droplets freezing instantly on contact with the airframe

D. Water vapor depositing directly as frost on the cold metal surfaces

12. What is the significance of a temperature inversion to a pilot?

A. It guarantees strong vertical mixing and improved surface visibility

B. It always produces severe turbulence at the inversion's upper boundary

C. It can trap moisture and pollutants, reducing visibility beneath it

D. It eliminates the possibility of any fog forming near the surface

13. What is radiation fog and under what conditions does it typically form?

A. Fog formed by warm air flowing over a much colder water surface

B. Fog formed on clear calm nights as the ground cools the air to saturation

C. Fog formed by strong winds lifting moist air up a sloping terrain

D. Fog formed by a frontal boundary lifting warm moist air aloft

14. What distinguishes advection fog from radiation fog?

A. Advection fog requires clear calm conditions and forms only at night

B. Advection fog forms when moist air moves over a cooler surface

C. Advection fog dissipates with any surface wind above a few knots

D. Advection fog forms only over land and never near coastal waters

15. What does a METAR entry of "BKN025" indicate?

A. A scattered cloud layer with bases at twenty-five thousand feet

B. Visibility of twenty-five hundred meters at the reporting station

C. An overcast layer with bases at two thousand five hundred feet

D. A broken cloud layer with bases at two thousand five hundred feet

16. What does the entry "TEMPO" in a TAF signify?

A. The prevailing conditions expected for the entire forecast period

B. A permanent change to the forecast conditions at a specific time

C. The current observed conditions at the time the forecast was issued

D. Temporary fluctuations expected to last less than half the period

17. What does "wind shear" describe in aviation weather?

A. A steady prevailing wind that remains constant with increasing altitude

B. The friction effect of wind moving over a smooth water surface

C. A change in wind speed or direction over a relatively short distance

D. A circular wind pattern centered on a stationary pressure system

18. What weather hazard is indicated by the presence of virga?

A. Steady widespread precipitation reaching the surface from stratus

B. A stable layer of fog forming along a coastal boundary at night

C. Precipitation evaporating before reaching the ground, hinting at downdrafts

D. A warm front approaching with prolonged low ceilings and rain

19. What is the primary cause of clear-air turbulence at high altitudes?

A. Convective updrafts rising from heated terrain far below the aircraft

B. Wind shear associated with the jet stream and its strong gradients

C. Mountain wave activity confined to the lee side of high terrain

D. Frontal lifting along a slow-moving surface boundary at low levels

20. What does a squall line represent and where does it often form?

A. A gentle band of stratus clouds producing light steady drizzle

B. A line of active thunderstorms often forming ahead of a cold front

C. A region of calm air separating two adjacent warm air masses

D. A widespread area of fog forming along a mountain ridge at dawn

21. What does the dewpoint indicate about the air?

A. The current air temperature measured at the reporting station

B. The altitude at which clouds will begin to form during a climb

C. The wind speed required to disperse fog from a given area

D. The temperature to which air must cool to reach saturation

22. What does a small temperature-dewpoint spread suggest?

A. Very dry air with little chance of cloud or fog formation

B. Strong turbulence developing within the next several hours

C. Air near saturation, with fog or low clouds likely to form

D. Rapidly rising surface temperatures throughout the morning

23. What is the standard atmospheric lapse rate of temperature with altitude?

A. About 2 degrees Celsius of cooling per thousand feet of altitude

B. About 5 degrees Celsius of cooling per thousand feet of altitude

C. About 1 degree Celsius of warming per thousand feet of altitude

D. About 3 degrees Celsius of cooling per thousand feet of altitude

24. What does a Convective SIGMET specifically warn pilots about?

A. Moderate turbulence and sustained strong surface winds over an area

B. Thunderstorms, severe turbulence, severe icing, and related hazards

C. IFR conditions and widespread mountain obscuration over a region

D. Light rime icing expected at low altitudes during the morning hours

25. What does an AIRMET Tango address?

A. Severe icing and embedded thunderstorm activity along a route

B. IFR ceilings and visibility plus widespread mountain obscuration

C. High-altitude clear-air turbulence affecting jet traffic exclusively

D. Moderate turbulence, strong surface winds, and low-level wind shear

26. What is the meaning of the entry "FZRA" in a weather report?

A. Light rain showers occurring intermittently near the reporting field

B. A forecast of rain expected to begin within the coming hour

C. Freezing rain, which poses a severe and rapid icing hazard

D. Heavy rain occurring at the station at the time of observation

27. What does a surface analysis chart primarily depict?

A. Forecast winds and temperatures aloft at several flight levels

B. Radar echo intensity showing the location of active precipitation

C. The expected movement of air masses over the next 24 hours

D. Pressure systems, fronts, and station weather at a valid time

28. What is the primary hazard associated with flying beneath a thunderstorm?

A. Rapid carburetor icing from the high moisture content beneath it

B. Severe downdrafts and wind shear that can exceed climb capability

C. Loss of all radio communication from atmospheric static buildup

D. Excessive engine cooling caused by the cold downdraft air column

29. What does the freezing level on a weather chart indicate?

A. The highest altitude at which any cloud formation is possible

B. The altitude where surface fog is most likely to develop overnight

C. The altitude where temperatures reach zero and icing becomes possible

D. The boundary above which all atmospheric turbulence will cease

30. What does a winds and temperatures aloft forecast provide?

A. Forecast wind direction, speed, and temperature at selected altitudes

B. The current surface wind observed at the departure airport

C. A radar-derived map of precipitation cells moving across a region

D. A long-range outlook of pressure systems several days ahead

31. What weather typically precedes the passage of a fast-moving cold front?

A. Gradually clearing skies with smooth air and steady falling pressure

B. A line of building cumulus and possible thunderstorms ahead of it

C. Widespread stratus and continuous light drizzle for many hours

D. Persistent radiation fog forming in calm clear overnight conditions

32. What is the effect of high relative humidity on thunderstorm development?

A. It suppresses convection by stabilizing the lower atmosphere strongly

B. It guarantees clear skies by preventing any moisture condensation

C. It has no measurable effect on the formation of convective storms

D. It supplies the moisture needed to fuel strong convective activity

33. What does the term "embedded thunderstorms" mean for an IFR pilot?

A. Storms hidden within cloud layers and not visible to the pilot

B. Storms that have fully dissipated but left turbulent residual air

C. Storms confined to the surface with no significant vertical growth

D. Storms producing only light precipitation and negligible hazard

34. What is the most reliable way to avoid embedded thunderstorms in flight?

A. Use onboard or ground-based radar information and strategic deviation

B. Rely on visual scanning through breaks in the surrounding clouds

C. Climb above the freezing level to remain clear of the storm cells

D. Maintain the planned route since IFR clearance ensures separation

35. What does a "trough" on a surface chart typically indicate?

A. A ridge of high pressure bringing stable clear conditions

B. A region of descending air producing widespread clearing

C. An elongated area of low pressure often associated with weather

D. A boundary where two air masses of equal density meet evenly

36. What is the significance of a steep pressure gradient on a surface chart?

A. It indicates light variable winds and generally calm conditions

B. It indicates strong winds because the isobars are spaced closely

C. It guarantees clear skies and excellent flight visibility ahead

D. It signals a stationary front with no significant air movement

37. What causes structural icing to accumulate most rapidly?

A. Flight through large supercooled droplets near the freezing level

B. Flight in clear dry air well below the ambient freezing temperature

C. Flight above the freezing level where no liquid moisture exists

D. Flight through dry snow that bounces off the airframe surfaces

38. What is the effect of structural ice on an aircraft's performance?

A. It increases lift and reduces drag by smoothing the wing surface

B. It decreases lift, increases drag, adds weight, and raises stall speed

C. It affects only the engine power output, not the airframe aerodynamics

D. It has a negligible effect as long as the ice remains thin and smooth

39. What does the entry "FEW" in a METAR cloud group indicate?

A. An overcast sky with complete cloud coverage at the reported level

B. A broken layer covering more than half of the visible sky dome

C. A scattered layer covering roughly half of the sky at that height

D. A small amount of cloud coverage, between one-eighth and two-eighths

40. What is the primary hazard of a temperature inversion near the surface?

A. It causes severe convective turbulence and rapid cloud building

B. It guarantees unrestricted visibility and smooth flying conditions

C. It produces strong updrafts that aid climb performance after takeoff

D. It can trap fog, haze, and pollutants and create low-level wind shear

41. What does the term "ceiling" mean in an aviation weather report?

A. The height of the lowest broken or overcast layer, or vertical visibility

B. The maximum altitude at which any cloud is present that day

C. The altitude of the highest scattered cloud layer reported at the field

D. The vertical distance between the two lowest reported cloud layers

42. What weather product gives a graphical depiction of forecast conditions across regions and time?

A. A single METAR issued for one specific reporting airport station

B. A pilot report filed by an aircraft encountering specific conditions

C. The Graphical Forecasts for Aviation showing clouds, weather, and hazards

D. A surface analysis chart depicting only current pressure systems

43. What is the danger of flying into an area of freezing drizzle?

A. The outside air temperature will drop abruptly without any warning

B. Carburetor heat becomes completely ineffective in such conditions

C. The static system will clog before the pitot system is affected

D. Supercooled droplets can produce rapid and dangerous ice accumulation

44. What is the relationship between atmospheric stability and turbulence?

A. Stable air produces strong vertical currents and rough turbulent flight

B. Stability has no measurable relationship to turbulence at any altitude

C. Unstable air smooths the flight while stable air produces turbulence

D. Unstable air promotes vertical currents that produce turbulent conditions

45. What does the presence of cumulonimbus clouds indicate?

A. Thunderstorm activity with associated turbulence, icing, and hazards

B. A stable air mass producing smooth flight and steady light rain

C. An approaching warm front bringing widespread low stratus clouds

D. Calm high-pressure conditions with excellent flying visibility

46. What is the primary value of a PIREP to other pilots and forecasters?

A. It forecasts conditions expected at an airport several hours ahead

B. It reports actual conditions encountered by an aircraft in flight

C. It provides a radar map of precipitation intensity across a region

D. It depicts the position of surface pressure systems and fronts

47. What does a falling barometric pressure trend typically indicate?

A. The arrival of a strong high-pressure system with clearing skies

B. A prolonged period of stable calm weather and light surface winds

C. Steadily improving conditions with increasing flight visibility ahead

D. An approaching low-pressure system or front with deteriorating weather

48. What is the meaning of a wind reported as "veering" with increasing altitude?

A. A wind decreasing steadily in speed as the altitude increases

B. A wind shifting clockwise in direction as altitude increases

C. A wind shifting counterclockwise in direction with increasing altitude

D. A wind reversing direction completely above the boundary layer

49. What does a "backing" wind indicate with increasing altitude?

A. A wind increasing steadily in speed with increasing altitude

B. A wind shifting clockwise in direction as the altitude increases

C. A wind shifting counterclockwise in direction with increasing altitude

D. A wind that remains constant in both speed and direction aloft

50. What is the primary hazard of a downburst during the approach phase?

A. Slow gradual cooling of the engine from the descending cold air

B. Loss of radio reception due to the static within the descending air

C. A sudden loss of airspeed and altitude from severe descending air

D. A persistent crosswind that gradually drifts the aircraft off course

51. What does the term "supercooled water" refer to in icing conditions?

A. Liquid water existing below freezing that freezes on aircraft contact

B. Water vapor that has frozen directly into ice crystals in the cloud

C. Water that has been warmed above freezing within a cloud layer

D. Frozen precipitation that melts as it passes through warmer air

52. What does a "ridge" on a surface weather chart represent?

A. An elongated area of low pressure often producing active weather

B. A boundary where two air masses of differing density meet

C. A region of rising air associated with cloud development and rain

D. An elongated area of high pressure usually bringing fair weather

53. What is the effect of frontal passage on wind direction?

A. The wind direction remains unchanged as the front passes the station

B. The wind always backs counterclockwise sharply during the passage

C. The wind decreases to calm during and after the frontal passage

D. The wind typically shifts, often veering as the front moves through

54. What does the entry "SCT" in a METAR cloud group indicate?

A. A small amount of cloud covering between one and two eighths of the sky

B. A scattered layer covering between three and four eighths of the sky

C. A broken layer covering between five and seven eighths of the sky

D. An overcast layer covering the entire sky at the reported height

55. What atmospheric condition is most favorable for the formation of fog?

A. Strong gusty winds mixing the lower atmosphere on a warm afternoon

B. High relative humidity with a small temperature-dewpoint spread

C. A deep unstable layer with strong vertical mixing near the surface

D. A rapidly moving cold front passing over a warm dry surface region

56. What is the primary characteristic of an unstable air mass?

A. Good visibility, cumuliform clouds, and turbulent vertical currents

B. Poor visibility, stratiform clouds, and smooth steady precipitation

C. Persistent fog, low stratus, and continuous light drizzle near terrain

D. Calm winds, clear skies, and a strong low-level temperature inversion

57. What does the term "frontal wave" describe in meteorology?

A. A developing disturbance forming along a stationary or slow front

B. A standing oscillation of air downwind of a mountain ridge line

C. The visible band of precipitation along a fast-moving cold front

D. The vertical movement of warm air over a retreating cold air mass

58. What weather is typically associated with the warm sector of a low-pressure system?

A. Clear cold air with strong gusty surface winds and rising pressure

B. A narrow band of severe thunderstorms and damaging surface hail

C. Warmer temperatures with the possibility of low stratus and drizzle

D. Rapidly clearing skies with smooth air and steeply falling pressure

59. What does a "low-level wind shear alert" warn pilots about?

A. High-altitude clear-air turbulence affecting only jet traffic above

B. A steady prevailing wind that is constant across all altitudes

C. Sudden wind changes near the surface hazardous on takeoff or landing

D. A gradual seasonal shift in the prevailing wind across a region

60. What is the most prudent action when thunderstorms are forecast along a route?

A. Climb above the freezing level to remain clear of the storm cells

B. Rely on ATC to vector the aircraft around all convective activity

C. Maintain the planned route since storms rarely affect IFR flights

D. Plan a strategy to avoid the convective activity and remain flexible

+ Answer Key

1. B — A stable air mass is characterized by stratiform clouds, poor visibility, and smooth steady precipitation. Stability suppresses vertical motion, producing layered clouds and continuous rain. Haze and fog are common in the trapped, stagnant air.

2. A — A cold front's narrow band of weather results from cold dense air rapidly undercutting and lifting the warmer air mass. The steep frontal slope forces abrupt lifting. This concentrates intense weather along the boundary.

3. D — A warm front is most associated with widespread stratiform clouds and prolonged steady precipitation. Warm air rises gradually over the retreating cold air. The gentle slope produces broad, layered weather ahead of the front.

4. A — A stationary front indicates that neither air mass has enough force to displace the other significantly. The boundary remains nearly in place. Weather can persist over an area for an extended period.

5. B — Thunderstorm formation requires unstable air, a lifting force, and sufficient moisture. All three must be present for convection to build. Removing any one prevents the storm from developing.

6. A — The three stages of a thunderstorm are the cumulus, mature, and dissipating stages. The cumulus stage features updrafts, the mature stage updrafts and downdrafts, and the dissipating stage downdrafts. Each stage has distinct hazards.

7. A — The mature stage presents the strongest hazards, with violent coexisting updrafts and downdrafts plus heavy precipitation. Wind shear and turbulence peak here. It is the most dangerous phase to encounter.

8. C — A microburst is a small, intense downdraft producing severe low-level wind shear, especially hazardous near the ground. It can force an aircraft into the terrain during approach or departure. Its rapid, localized nature makes it difficult to anticipate.

9. C — Standing lenticular clouds signify mountain wave activity with possible severe turbulence aloft. They form at the crests of standing waves downwind of terrain. Their smooth shape belies the violent air around them.

10. A — Clear ice forms from large supercooled droplets that spread before freezing, creating a dense, hard, smooth glaze. It is difficult to remove and adds significant weight. It is among the most hazardous icing types.

11. C — Rime ice forms when small supercooled droplets freeze instantly on contact, trapping air to create a rough, opaque deposit. It typically forms in stratiform clouds at colder temperatures. Its brittle texture distinguishes it from clear ice.

12. C — A temperature inversion can trap moisture and pollutants, reducing visibility beneath it. The stable layer suppresses vertical mixing. Haze, fog, and low-level wind shear are the practical concerns.

13. B — Radiation fog forms on clear, calm nights as the ground cools and chills the air to saturation. Calm winds and clear skies allow maximum radiational cooling. It forms in low areas and usually burns off after sunrise.

14. B — Advection fog forms when moist air moves over a cooler surface, cooling to its dewpoint. Unlike radiation fog, it can form with wind and over coastal waters. Wind sustains rather than dissipates it.

15. D — "BKN025" indicates a broken cloud layer with bases at 2,500 feet (the three digits are hundreds of feet). Broken means 5/8 to 7/8 sky coverage. This layer constitutes a ceiling.

16. D — A "TEMPO" group in a TAF signifies temporary fluctuations expected to last less than half the period. The conditions come and go rather than prevailing. Pilots plan for the possibility they occur.

17. C — Wind shear is a change in wind speed or direction over a relatively short distance, vertically or horizontally. It can cause rapid airspeed and altitude changes. Low-level shear near the ground is especially dangerous.

18. C — Virga is precipitation evaporating before reaching the ground, which hints at the presence of downdrafts. The evaporative cooling can drive strong descending air. It is a visual cue to possible wind shear beneath.

19. B — Clear-air turbulence at high altitude is primarily caused by wind shear associated with the jet stream and its strong gradients. It occurs in cloudless air and is hard to detect. PIREPs and forecasts help pilots anticipate it.

20. B — A squall line is a line of active thunderstorms often forming ahead of a cold front. It can produce the most violent weather, including severe turbulence and hail. Penetration is hazardous and avoidance is recommended.

21. D — The dewpoint is the temperature to which air must cool to reach saturation. When the temperature drops to the dewpoint, condensation forms clouds or fog. It is a key indicator of moisture in the air.

22. C — A small temperature-dewpoint spread suggests air near saturation, with fog or low clouds likely to form. High relative humidity accompanies the close spread. Pilots watch the spread for ceiling and visibility hazards.

23. A — The standard atmospheric lapse rate is about 2 degrees Celsius of cooling per thousand feet. It describes how temperature normally decreases with altitude. Deviations from it indicate atmospheric stability or instability.

24. B — A Convective SIGMET warns of thunderstorms, severe turbulence, severe icing, and related hazards. It is issued for conditions dangerous to all aircraft. It demands immediate attention during planning and flight.

25. D — AIRMET Tango addresses moderate turbulence, strong surface winds, and low-level wind shear. The Tango category covers turbulence-related hazards. It alerts pilots to widespread but moderate conditions.

26. C — "FZRA" denotes freezing rain, which poses a severe and rapid icing hazard. Large supercooled droplets accumulate ice quickly. It signals warmer air aloft and a dangerous icing environment.

27. D — A surface analysis chart depicts pressure systems, fronts, and station weather valid at a specific time. It is a snapshot of the surface situation. Pilots use it to understand the large-scale pattern.

28. B — The primary hazard beneath a thunderstorm is severe downdrafts and wind shear that can exceed the aircraft's climb capability. Microbursts can force an aircraft into the ground. This is why pilots avoid flying under storms.

29. C — The freezing level is the altitude where temperatures reach zero degrees and icing becomes possible in visible moisture. Flying in clouds or precipitation near and above it risks structural ice. It is a key icing-avoidance reference.

30. A — A winds and temperatures aloft forecast provides forecast wind direction, speed, and temperature at selected altitudes. It supports altitude selection and fuel planning. It is a forecast product, not a surface observation.

31. B — A fast-moving cold front is typically preceded by a line of building cumulus and possible thunderstorms ahead of it. The rapid lifting generates convection. Hazards concentrate along and ahead of the boundary.

32. D — High relative humidity supplies the moisture needed to fuel strong convective activity. Abundant moisture supports cloud growth and precipitation. It is one of the three ingredients for thunderstorms.

33. A — "Embedded thunderstorms" are storms hidden within cloud layers and not visible to the pilot. Because they cannot be seen and avoided visually, they pose a special hazard. Radar is needed to detect and avoid them.

34. A — The most reliable way to avoid embedded thunderstorms is to use onboard or ground-based radar information and deviate strategically. Radar reveals the hidden cells. Strategic deviation keeps the aircraft clear of the hazards.

35. C — A trough is an elongated area of low pressure often associated with weather. Converging, rising air promotes clouds and precipitation. Troughs frequently mark zones of unsettled conditions.

36. B — A steep pressure gradient, shown by closely spaced isobars, indicates strong winds. The tighter the spacing, the stronger the wind. Pilots anticipate gusty or strong surface winds in such areas.

37. A — Structural icing accumulates most rapidly during flight through large supercooled droplets near the freezing level. The large droplets deliver more water to freeze on the airframe. Freezing rain and drizzle are particularly hazardous.

38. B — Structural ice decreases lift, increases drag, adds weight, and raises stall speed. It degrades the airfoil and overall performance. Approach and landing become especially hazardous when iced.

39. D — "FEW" indicates a small amount of cloud coverage, between one-eighth and two-eighths of the sky. It is the lightest reported coverage above clear. It does not constitute a ceiling.

40. D — A surface temperature inversion can trap fog, haze, and pollutants and create low-level wind shear. The stable layer decouples surface and upper winds. The shear can affect aircraft during climb-out or approach.

41. A — "Ceiling" is the height of the lowest broken or overcast layer, or the vertical visibility into an obscuration. Scattered layers do not count as a ceiling. It is a defining value for approach minimums.

42. C — The Graphical Forecasts for Aviation provide a graphical depiction of forecast clouds, weather, and hazards across regions and time. They integrate model and forecast data visually. They support route and altitude planning.

43. D — The danger of freezing drizzle is that supercooled droplets can produce rapid and dangerous ice accumulation. The droplets freeze on contact with the airframe. It can overwhelm de-icing capabilities quickly.

44. D — Unstable air promotes vertical currents that produce turbulent conditions. Rising and sinking air create the bumps. Stable air, by contrast, tends to produce smoother flight.

45. A — Cumulonimbus clouds indicate thunderstorm activity with associated turbulence, icing, and other hazards. They are the towering convective storm clouds. Their presence warns of severe weather to avoid.

46. B — A PIREP's primary value is reporting actual conditions encountered by an aircraft in flight, such as icing, turbulence, or cloud tops. It confirms real conditions rather than forecasts. This aids other pilots and forecasters.

47. D — A falling barometric pressure trend typically indicates an approaching low-pressure system or front and deteriorating weather. The drop reflects rising, unstable air moving in. It warns of worsening ceilings and visibility.

48. B — A veering wind shifts clockwise in direction with increasing altitude (for example, south to west). It often indicates warm air advection. The opposite shift is called backing.

49. C — A backing wind shifts counterclockwise in direction with increasing altitude. It often indicates cold air advection. It is the opposite of a veering wind.

50. C — The primary hazard of a downburst on approach is a sudden loss of airspeed and altitude from the severe descending air. The aircraft can be driven toward the ground. Recognizing and avoiding it is critical near the runway.

51. A — Supercooled water is liquid water existing below freezing that freezes on contact with the aircraft. It is the source of structural icing in clouds and precipitation. Impact triggers the freezing onto the airframe.

52. D — A ridge is an elongated area of high pressure usually bringing fair weather. Descending, stable air suppresses cloud formation. Ridges generally indicate good flying conditions.

53. D — Frontal passage typically causes the wind to shift, often veering as the front moves through. The shift accompanies the change in air mass. Pilots anticipate the wind change during passage.

54. B — "SCT" indicates a scattered layer covering between three and four eighths of the sky. It is more than few but less than broken. A scattered layer does not constitute a ceiling.

55. B — Fog is most favored by high relative humidity with a small temperature-dewpoint spread. Air near saturation readily condenses into fog. Calm or light winds and cooling complete the conditions.

56. A — An unstable air mass is characterized by good visibility, cumuliform clouds, and turbulent vertical currents. Rising air builds heaped clouds and showery weather. Visibility is generally good outside the showers.

57. A — A frontal wave is a developing disturbance forming along a stationary or slow-moving front. It can intensify into a low-pressure system. It marks the early stage of cyclone development.

58. C — The warm sector of a low-pressure system typically brings warmer temperatures with the possibility of low stratus and drizzle. It lies between the warm and cold fronts. Conditions are milder but can include reduced ceilings.

59. C — A low-level wind shear alert warns of sudden wind changes near the surface that are hazardous on takeoff or landing. It signals dangerous shear in the critical low-altitude phase. Pilots prepare for rapid airspeed and performance changes.

60. D — The most prudent action when thunderstorms are forecast along a route is to plan a strategy to avoid the convective activity and remain flexible. Proactive avoidance and adaptability are key. Relying on luck or clearance alone is unsafe.