PRACTICE EXAM 26 SIMULATION

1. Structural icing requires two conditions: visible moisture and a temperature at the freezing point or:

A. Above freezing

B. Below freezing at the point where the moisture strikes the aircraft

C. Above 10 degrees Celsius

D. Below minus 40 degrees only

2. Clear ice forms when:

A. Small droplets freeze instantly

B. The air is dry

C. The temperature is above freezing

D. Large supercooled droplets flow back and freeze into a smooth, hard layer

3. Rime ice forms when:

A. Large droplets spread before freezing

B. The temperature is above freezing

C. There is no moisture

D. Small supercooled droplets freeze rapidly on contact, trapping air

4. Mixed ice is a combination of:

A. Clear and rime ice characteristics

B. Frost and dew

C. Snow and hail

D. Fog and mist

5. The most dangerous icing condition involves:

A. Dry snow

B. Freezing rain or supercooled large droplets

C. Light haze

D. High cirrus clouds

6. Freezing rain encountered in flight indicates:

A. No hazard

B. Warmer air below

C. Clear skies ahead

D. Warmer air above, with supercooled rain falling into colder air

7. The effect of structural icing on the airfoil is to:

A. Improve lift

B. Reduce drag

C. Lower the stall speed

D. Disrupt airflow, reduce lift, increase drag, and raise the stall speed

8. A pilot encountering icing should:

A. Increase the angle of attack

B. Exit the icing conditions by changing altitude or course

C. Continue without action

D. Reduce power to idle

9. Induction icing, such as carburetor ice, can occur:

A. Only below freezing outside

B. Even at outside temperatures well above freezing

C. Only in clouds

D. Only at high altitude

10. A thunderstorm requires three ingredients: moisture, instability, and:

A. A lifting force

B. Calm winds

C. High pressure only

D. Clear skies

11. The three stages of a thunderstorm, in order, are:

A. Mature, cumulus, dissipating

B. Cumulus, mature, dissipating

C. Dissipating, mature, cumulus

D. Cumulus, dissipating, mature

12. The cumulus stage of a thunderstorm is characterized by:

A. Heavy rain at the surface

B. The anvil top

C. Predominantly downdrafts

D. Predominantly updrafts as the cloud builds

13. The mature stage of a thunderstorm, the most hazardous, is marked by:

A. Only updrafts

B. Both updrafts and downdrafts, heavy precipitation, and the greatest turbulence

C. Dissipation

D. Calm conditions

14. The dissipating stage of a thunderstorm is dominated by:

A. Updrafts

B. Building cumulus

C. Downdrafts as the storm rains out

D. The anvil forming

15. A squall line is a:

A. Line of thunderstorms, often ahead of a cold front, difficult to circumnavigate

B. Single isolated storm

C. Layer of stratus cloud

D. Region of clear air

16. An embedded thunderstorm is hazardous because it is:

A. Obscured within other cloud layers and hard to detect visually

B. Always visible

C. Only present at night

D. Weak and harmless

17. A microburst is a:

A. Light, steady wind

B. High-altitude jet stream

C. Small, intense downdraft that spreads outward near the surface

D. Type of fog

18. The greatest danger of a microburst to an aircraft on approach is:

A. Reduced visibility only

B. Hail only

C. Lightning only

D. A rapid loss of airspeed and altitude as the aircraft passes through the shear

19. Low-level wind shear is a sudden change in wind speed or direction that:

A. Only occurs at high altitude

B. Is harmless near the ground

C. Can cause dangerous airspeed and performance changes near the ground

D. Improves climb performance

20. Wind shear can be associated with all of the following EXCEPT:

A. Thunderstorms

B. Temperature inversions

C. Frontal zones

D. A clear, calm high-pressure day with no temperature gradient

21. A pilot encountering a microburst on approach should:

A. Continue the approach

B. Reduce power

C. Apply maximum available power and go around

D. Increase the descent rate

22. Turbulence associated with thunderstorms can extend:

A. Only within the cloud

B. Only above the cloud

C. Well outside the visible cloud, including beneath the anvil and in clear air nearby

D. Only at the surface

23. Clear air turbulence (CAT) is often associated with:

A. Thunderstorms only

B. The jet stream and wind shear at high altitude

C. Fog

D. Surface heating only

24. The recommended distance to avoid a severe thunderstorm is at least:

A. 20 nautical miles

B. 5 nautical miles

C. 2 nautical miles

D. 1 nautical mile

25. A pilot should never attempt to fly:

A. Above any cloud

B. Through or under a thunderstorm

C. In light rain

D. In smooth air

26. Hail can be encountered:

A. Only directly under the storm

B. Several miles from the storm core, even in clear air beneath the anvil

C. Only at the surface

D. Only at night

27. A tornado is associated with:

A. Severe thunderstorms and intense updrafts

B. Stratus clouds

C. Fog

D. High pressure

28. Turbulence is categorized by intensity as light, moderate, severe, and:

A. Calm

B. Smooth

C. Steady

D. Extreme

29. Severe turbulence causes:

A. No effect on control

B. Large, abrupt changes in altitude and attitude, with the aircraft momentarily out of control

C. A smooth ride

D. Improved performance

30. The proper airspeed for penetrating turbulence (if unavoidable) is:

A. Maximum cruise speed

B. Best glide speed

C. The recommended turbulence-penetration speed (near maneuvering speed)

D. Stall speed

31. Flying faster than maneuvering speed in severe turbulence risks:

A. Structural damage from gust loads

B. Improved control

C. Lower stall speed

D. Better stability

32. A temperature inversion can produce wind shear because:

A. A layer of warm air over cold air can cap a low-level wind difference

B. It eliminates wind

C. It only occurs over water

D. It has no effect on wind

33. Frost on the wings before flight must be:

A. Left in place

B. Removed before flight, as it disrupts airflow and lift

C. Polished smooth

D. Ignored if thin

34. A pilot should consider icing likely when flying in visible moisture at temperatures between:

A. 0 and minus 20 degrees Celsius (and near freezing)

B. Plus 20 and plus 40 degrees Celsius

C. Minus 40 and minus 60 degrees Celsius

D. Above plus 10 degrees Celsius only

35. A thunderstorm's gust front is the:

A. Anvil top

B. Region of light rain

C. Calm center

D. Leading edge of cool downdraft air spreading out ahead of the storm

36. A pilot should expect the most severe turbulence and hazards in which part of a mature thunderstorm?

A. The anvil only

B. The clear air above

C. The dissipating edge

D. The area of strongest updrafts and downdrafts within the cell

37. Supercooled large droplets (SLD) are especially hazardous because they:

A. Cannot freeze

B. Are harmless

C. Can freeze beyond the protected (de-iced) surfaces of the aircraft

D. Only form above freezing

38. A pilot encountering moderate icing should:

A. Continue and monitor

B. Take immediate action to exit the icing, such as a climb or descent to warmer or drier air

C. Increase the angle of attack

D. Reduce airspeed only

39. The presence of a cumulonimbus cloud indicates:

A. Calm, stable air

B. A thunderstorm with associated hazards

C. Light fog

D. Clear skies

40. A pilot should avoid flying beneath a thunderstorm because of:

A. Improved visibility

B. Smooth air

C. Severe downdrafts, wind shear, and microbursts

D. Reduced turbulence

41. The jet stream is a narrow band of strong winds where which hazard is common?

A. Surface fog

B. Icing only

C. Clear air turbulence

D. Hail

42. A pilot encountering severe turbulence should:

A. Increase speed

B. Make large control inputs

C. Chase the airspeed and altitude

D. Maintain a level attitude, slow to turbulence-penetration speed, and avoid abrupt inputs

43. Thunderstorms may be detected and avoided using:

A. The magnetic compass

B. Onboard or ground-based weather radar and ATC

C. The altimeter

D. The fuel gauge

44. The hazard of "ice-induced tailplane stall" can occur when ice on the horizontal stabilizer causes:

A. Improved pitch control

B. A nose-up tendency

C. No effect

D. A sudden nose-down pitch, often when flaps are extended

45. A pilot who detects airframe ice accumulating should remember that ice:

A. Reduces weight

B. Improves the lift-to-drag ratio

C. Has no effect on stall speed

D. Increases weight and stall speed while reducing performance

46. A convective SIGMET warns of:

A. Light winds

B. Fog

C. Severe thunderstorm activity and associated hazards

D. Clear skies

47. The best strategy regarding thunderstorms is to:

A. Avoid them by a wide margin

B. Fly through the weakest-looking part

C. Fly directly beneath them

D. Circle inside the cell

48. A microburst typically lasts:

A. Several hours

B. A full day

C. A brief period (minutes), making it hard to predict and very dangerous

D. A week

49. A pilot experiencing an increasing headwind followed by a sudden tailwind on approach should suspect:

A. Normal conditions

B. Improved performance

C. Wind shear, possibly a microburst

D. A fuel problem

50. Anti-ice and de-ice systems are designed to:

A. Prevent or remove ice from protected surfaces

B. Increase ice accumulation

C. Improve fuel economy

D. Replace the pitot heat only

51. A pilot without ice protection encountering icing must:

A. Continue indefinitely

B. Increase the angle of attack

C. Ignore it

D. Exit the icing immediately, as the aircraft is not certified for it

52. The turbulence reported by a pilot as causing "slight, rapid bumpiness without appreciable changes in attitude" is classified as:

A. Severe

B. Extreme

C. Light

D. Moderate

53. Turbulence that causes "changes in altitude or attitude but with the aircraft remaining in positive control" is classified as:

A. Light

B. Extreme

C. Severe

D. Moderate

54. A pilot should report encountered icing and turbulence via a:

A. PIREP

B. METAR

C. TAF

D. Surface analysis

55. Wind shear on takeoff that produces a sudden loss of airspeed requires the pilot to:

A. Apply maximum power and fly the escape/recovery procedure

B. Reduce power

C. Lower the nose sharply

D. Continue the climb unchanged

56. The cumulonimbus anvil points in the direction of:

A. The surface wind

B. The storm's origin

C. The upper-level winds, indicating storm movement direction

D. The nearest airport

57. A pilot should treat any thunderstorm as potentially containing:

A. Severe turbulence, hail, lightning, icing, and wind shear

B. Only light rain

C. Calm air

D. Improved visibility

58. The safest action when faced with a line of thunderstorms with no clear gap is to:

A. Fly through the smallest cell

B. Fly beneath the line

C. Fly over the tops at any altitude

D. Delay, divert, or wait for the line to pass rather than penetrate it

59. A pilot encountering unexpected severe turbulence should primarily focus on:

A. Maintaining airspeed precisely

B. Holding altitude exactly

C. Maintaining aircraft control and a level attitude, accepting altitude variations

D. Increasing speed

60. The fundamental rule regarding hazardous convective weather and icing is to:

A. Penetrate them at high speed

B. Avoid them, since these conditions can exceed the aircraft's and pilot's capabilities

C. Fly through them to save time

D. Ignore forecasts

Answer Key

1. B — Structural icing requires visible moisture and a temperature at or below freezing at the point where the moisture strikes the aircraft. Both conditions must be present.

2. D — Clear ice forms when large supercooled droplets flow back and freeze into a smooth, hard layer. It is heavy and the more hazardous type.

3. D — Rime ice forms when small supercooled droplets freeze rapidly on contact, trapping air. It is rough and opaque.

4. A — Mixed ice combines clear and rime ice characteristics. It forms when droplet sizes vary.

5. B — The most dangerous icing involves freezing rain or supercooled large droplets. These can freeze beyond the protected surfaces.

6. D — Freezing rain indicates warmer air above, with supercooled rain falling into colder air. The melted precipitation refreezes on contact.

7. D — Structural icing disrupts airflow, reduces lift, increases drag, and raises the stall speed. It severely degrades performance.

8. B — A pilot encountering icing should exit the icing conditions by changing altitude or course. Removing the aircraft from the icing is the priority.

9. B — Induction icing such as carburetor ice can occur even at outside temperatures well above freezing. The venturi cooling drops the temperature below freezing internally.

10. A — A thunderstorm requires moisture, instability, and a lifting force. All three ingredients must be present.

11. B — The three stages, in order, are cumulus, mature, dissipating. The storm builds, peaks, and rains out.

12. D — The cumulus stage is characterized by predominantly updrafts as the cloud builds. Rain has not yet reached the surface.

13. B — The mature stage, the most hazardous, has both updrafts and downdrafts, heavy precipitation, and the greatest turbulence. It is the peak of the storm's intensity.

14. C — The dissipating stage is dominated by downdrafts as the storm rains out. The updrafts have weakened.

15. A — A squall line is a line of thunderstorms, often ahead of a cold front, difficult to circumnavigate. It can present a continuous barrier.

16. A — An embedded thunderstorm is obscured within other cloud layers and hard to detect visually. This makes avoidance difficult.

17. C — A microburst is a small, intense downdraft that spreads outward near the surface. It produces dangerous wind shear.

18. D — The greatest microburst danger on approach is a rapid loss of airspeed and altitude as the aircraft passes through the shear. The shift from headwind to tailwind robs performance.

19. C — Low-level wind shear is a sudden change in wind that can cause dangerous airspeed and performance changes near the ground. Its proximity to the ground leaves little recovery margin.

20. D — Wind shear is associated with thunderstorms, temperature inversions, and frontal zones, but not a clear, calm high-pressure day with no temperature gradient. Shear requires a wind or temperature difference.

21. C — Encountering a microburst on approach, the pilot applies maximum available power and goes around. Maximum performance is needed to escape the shear.

22. C — Thunderstorm turbulence can extend well outside the visible cloud, including beneath the anvil and in clear air nearby. The hazard is not confined to the cloud.

23. B — Clear air turbulence is often associated with the jet stream and wind shear at high altitude. It occurs without visible cloud cues.

24. A — The recommended distance to avoid a severe thunderstorm is at least 20 nautical miles. This margin accounts for hail and turbulence outside the core.

25. B — A pilot should never attempt to fly through or under a thunderstorm. The hazards inside and beneath are extreme.

26. B — Hail can be encountered several miles from the storm core, even in clear air beneath the anvil. It is thrown out by the updrafts.

27. A — A tornado is associated with severe thunderstorms and intense updrafts. The strongest storms can spawn tornadoes.

28. D — Turbulence intensity is categorized as light, moderate, severe, and extreme. Extreme is the most violent category.

29. B — Severe turbulence causes large, abrupt changes in altitude and attitude, with the aircraft momentarily out of control. It is dangerous and stressful to the airframe.

30. C — The proper turbulence-penetration speed is near maneuvering speed. It minimizes the risk of structural overstress.

31. A — Flying faster than maneuvering speed in severe turbulence risks structural damage from gust loads. V_A protects against overstress.

32. A — A temperature inversion can produce wind shear because a layer of warm air over cold air can cap a low-level wind difference. The boundary creates a shear zone.

33. B — Frost must be removed before flight, as it disrupts airflow and lift. Even thin frost degrades the wing.

34. A — Icing is likely in visible moisture at temperatures between 0 and about minus 20 degrees Celsius (and near freezing). This is the prime icing range.

35. D — A thunderstorm's gust front is the leading edge of cool downdraft air spreading out ahead of the storm. It can produce wind shear well before the storm arrives.

36. D — The most severe turbulence is in the area of strongest updrafts and downdrafts within the cell. The mature cell core is the worst.

37. C — Supercooled large droplets are hazardous because they can freeze beyond the protected (de-iced) surfaces of the aircraft. The ice forms where protection cannot remove it.

38. B — Moderate icing calls for immediate action to exit the icing, such as a climb or descent to warmer or drier air. Prompt action prevents dangerous accumulation.

39. B — A cumulonimbus cloud indicates a thunderstorm with associated hazards. It is the thunderstorm cloud.

40. C — A pilot avoids flying beneath a thunderstorm because of severe downdrafts, wind shear, and microbursts. The area below is extremely hazardous.

41. C — The jet stream is a band of strong winds where clear air turbulence is common. CAT occurs in the shear zones near the jet.

42. D — In severe turbulence, the pilot maintains a level attitude, slows to turbulence-penetration speed, and avoids abrupt inputs. Holding attitude and accepting altitude variation is the technique.

43. B — Thunderstorms are detected and avoided using onboard or ground-based weather radar and ATC. These reveal the storm locations.

44. D — Ice-induced tailplane stall can cause a sudden nose-down pitch, often when flaps are extended. Ice on the stabilizer disrupts its airflow.

45. D — Airframe ice increases weight and stall speed while reducing performance. It degrades the aircraft in multiple ways.

46. C — A Convective SIGMET warns of severe thunderstorm activity and associated hazards. It denotes the most severe convective weather.

47. A — The best thunderstorm strategy is to avoid them by a wide margin. Penetration or flying beneath them is dangerous.

48. C — A microburst typically lasts a brief period of minutes, making it hard to predict and very dangerous. Its short life and intensity are the hazard.

49. C — An increasing headwind followed by a sudden tailwind on approach suggests wind shear, possibly a microburst. The wind reversal robs performance.

50. A — Anti-ice and de-ice systems prevent or remove ice from protected surfaces. They protect critical areas of the airframe.

51. D — A pilot without ice protection encountering icing must exit the icing immediately, as the aircraft is not certified for it. The aircraft cannot safely remain in icing.

52. C — "Slight, rapid bumpiness without appreciable changes in attitude" is light turbulence. It is the mildest category.

53. D — Turbulence causing "changes in altitude or attitude but with the aircraft remaining in positive control" is moderate. The pilot retains control throughout.

54. A — Encountered icing and turbulence are reported via a PIREP. The PIREP shares the real-time hazard with others.

55. A — Wind shear on takeoff producing a sudden loss of airspeed requires applying maximum power and flying the escape/recovery procedure. Maximum performance is needed to recover.

56. C — The cumulonimbus anvil points in the direction of the upper-level winds, indicating storm movement direction. The anvil is blown downwind aloft.

57. A — A pilot should treat any thunderstorm as potentially containing severe turbulence, hail, lightning, icing, and wind shear. All these hazards can be present.

58. D — Facing a line of thunderstorms with no clear gap, the safest action is to delay, divert, or wait for the line to pass rather than penetrate it. Penetration is too dangerous.

59. C — In unexpected severe turbulence, the pilot focuses on maintaining aircraft control and a level attitude, accepting altitude variations. Control takes priority over precise altitude.

60. B — The fundamental rule regarding hazardous convective weather and icing is to avoid them, since these conditions can exceed the aircraft's and pilot's capabilities. Avoidance is the core principle.