PRACTICE EXAM 13

1. A takeoff distance chart is entered with the outside air temperature, pressure altitude, weight, and wind. The general technique is to:

A. Read the answer directly from a single number with no lines to follow

B. Average all four input values to find the result

C. Enter at the known condition and follow the guide lines in order

D. Ignore the wind and weight, using only temperature

2. At a pressure altitude of 5,000 feet with an outside air temperature of 25°C (standard temperature 5°C), the density altitude is approximately:

A. 5,000 feet, equal to the pressure altitude

B. 3,000 feet, below the pressure altitude

C. 7,400 feet

D. 12,000 feet

3. A wind of 16 knots at 60° to the runway produces a crosswind component of approximately:

A. 16 knots, the full wind speed

B. 0 knots, since it is all headwind

C. 8 knots

D. 13.9 knots

4. A performance chart shows a book takeoff distance of 1,000 feet. Applying a conservative 50% safety margin, the planned distance is:

A. 1,000 feet, with no margin added

B. 1,100 feet

C. 1,500 feet

D. 500 feet

5. A climb performance chart shows a rate of climb of 500 feet per minute. To climb 3,000 feet will take approximately:

A. 3 minutes

B. 30 minutes

C. 6 minutes

D. 15 minutes

6. A cruise performance table shows a fuel flow of 8 gallons per hour. For 2.5 hours of cruise, the fuel burned is:

A. 8 gallons

B. 16 gallons

C. 10.5 gallons

D. 20 gallons

7. Published performance figures generally assume conditions that are:

A. Worse than a typical pilot would achieve

B. Ideal, with a new airplane and skilled pilot

C. Identical to every real-world flight

D. Only valid at high density altitude

8. The crosswind component chart in Question 3 yields about 13.9 knots. If the airplane's demonstrated crosswind is 12 knots, the pilot should recognize that the crosswind:

A. Is well within the demonstrated capability

B. Exactly equals the demonstrated value

C. Exceeds the demonstrated crosswind component

D. Has no relationship to the demonstrated value

9. A density altitude chart is used to convert which inputs into density altitude?

A. Wind speed and runway length

B. Aircraft weight and fuel load

C. True airspeed and groundspeed

D. Pressure altitude and temperature

10. A landing distance chart typically provides the distance to clear an obstacle of:

A. 100 feet

B. 50 feet

C. 200 feet

D. 25 feet

11. Reading a performance chart, a pilot must use the exact given conditions because:

A. The chart automatically corrects any input value entered

B. Performance charts disregard temperature and wind

C. The chart applies only to the airplane's empty weight

D. Entering at the wrong point yields an incorrect result

12. The standard temperature at a pressure altitude of 8,000 feet is approximately:

A. +15°C, the sea-level standard

B. +9°C

C. +5°C

D. −1°C

13. A headwind component on takeoff, read from a wind chart, affects the required distance by:

A. Increasing the ground roll needed

B. Having no effect on the distance

C. Decreasing the ground roll needed

D. Doubling the distance required

14. A pilot at a field elevation of 2,000 feet sets the local altimeter to 30.12 inHg. The pressure altitude is approximately:

A. 2,200 feet, higher than field elevation

B. 2,000 feet, equal to field elevation

C. 1,800 feet

D. 4,000 feet

15. When following the guide lines on a multi-segment performance chart, the pilot typically:

A. Enters at the temperature, moves to the altitude line, then across through weight and wind references

B. Reads only the final axis without entering the chart

C. Starts at the answer and works backward to the inputs

D. Uses the wind line first, ignoring temperature and altitude

16. A higher density altitude read from a chart will show takeoff and landing distances that are:

A. Shorter than at sea level standard

B. Unchanged regardless of density altitude

C. Shorter on takeoff but longer on landing

D. Longer than at sea level standard

17. A cruise table lists true airspeed and fuel flow for various power settings and altitudes. Selecting a higher altitude typically shows:

A. A guaranteed increase in fuel flow at all settings

B. No change in true airspeed at any setting

C. A required increase in the crosswind component

D. Different true airspeed and fuel flow values to read

18. The crosswind component is the part of the wind that:

A. Acts perpendicular to the runway and must be controlled

B. Acts directly down the runway, aiding the takeoff

C. Has no effect on the airplane during landing

D. Reduces the airplane's stall speed in a turn

19. A pilot reads a takeoff chart at a high weight and finds the distance has:

A. Decreased compared to a lighter weight

B. Increased compared to a lighter weight

C. Remained the same regardless of weight

D. Become independent of density altitude

20. The headwind component of a 16-knot wind 60° off the runway is approximately:

A. 8 knots

B. 16 knots

C. 13.9 knots

D. 0 knots

21. A pilot determines pressure altitude by setting the altimeter to:

A. 29.92 inHg and reading the indicated altitude

B. The local altimeter setting and reading field elevation

C. The destination's altimeter setting only

D. Zero and reading the difference

22. A climb chart shows rate of climb decreasing as the pilot reads up the altitude scale because:

A. The airplane becomes heavier as it climbs

B. The crosswind component increases with altitude

C. Fuel flow rises sharply at higher altitudes

D. Excess power available decreases with altitude

23. Adding a real-world safety margin to a book landing distance is wise because:

A. The chart figures are deliberately overstated

B. Actual performance is often worse than the ideal-condition figures

C. The runway markings already include the margin

D. The airplane always exceeds the published numbers

24. A landing distance chart shows both ground roll and total distance. The total distance accounts for:

A. Only the rollout after touchdown

B. Only the taxi back to parking

C. The fuel burned during the approach

D. Clearing a 50-foot obstacle plus the ground roll

25. A pilot reading a density altitude chart on a hot day at a high-elevation airport should expect the density altitude to be:

A. Thousands of feet higher than the field elevation

B. Equal to the field elevation in all cases

C. Lower than the field elevation

D. Unaffected by the temperature

26. Wind components are read from a chart to ensure the crosswind stays within:

A. The airplane's never-exceed speed

B. The airplane's demonstrated crosswind capability

C. The maximum gross weight limit

D. The published service ceiling

27. A performance chart's "reference line" is used to:

A. Mark where the pilot transitions to follow the next set of guide lines

B. Indicate the final answer with no further reading

C. Show the airplane's empty weight only

D. Display the magnetic variation for the area

28. A pilot finds the computed takeoff distance exceeds the available runway. The safest action is to:

A. Reduce weight, wait for cooler air, or choose a longer runway

B. Attempt the takeoff anyway and rotate early

C. Ignore the chart, since figures are conservative

D. Add fuel to increase the airplane's performance

29. True airspeed for a given indicated airspeed, read from cruise data at higher density altitude, generally:

A. Decreases below the indicated airspeed

B. Equals the indicated airspeed exactly

C. Increases above the indicated airspeed

D. Has no relationship to density altitude

30. A pilot planning a short-field takeoff at high density altitude should expect the chart to show:

A. A longer ground roll and reduced climb performance

B. A shorter ground roll and improved climb

C. No change from sea-level performance

D. An automatic correction requiring no planning

31. Pressure altitude is defined as the altitude read when the altimeter is set to:

A. 29.92 inHg, the standard datum

B. The current local altimeter setting

C. The field elevation directly

D. The destination's forecast setting

32. A wind component chart breaks a reported wind into:

A. True airspeed and groundspeed

B. Pressure altitude and density altitude

C. Headwind and crosswind components

D. Indicated and calibrated airspeed

33. A climb performance chart is entered with weight, altitude, and:

A. The crosswind component for the runway

B. Temperature

C. The aircraft's registration number

D. The destination's altimeter setting

34. A pilot reads a takeoff distance of 1,000 feet from the chart but the runway is 1,100 feet long. Considering real-world margins, the pilot should:

A. Treat the runway as marginal and reconsider the operation

B. Proceed confidently with ample margin remaining

C. Add weight to shorten the takeoff roll

D. Disregard the chart and depart normally

35. The effect of a tailwind component, if read from a wind chart for takeoff, would be to:

A. Decrease the required takeoff distance

B. Increase the required takeoff distance

C. Have no effect on takeoff distance

D. Reduce the airplane's stall speed

36. A density altitude of 7,400 feet, computed from a chart, means the airplane will perform as though it were at:

A. Sea level on a standard day

B. A higher altitude than its actual pressure altitude

C. A lower altitude with denser air

D. Its maximum certificated service ceiling

37. When a performance chart provides separate columns for different temperatures, the pilot should:

A. Always use the coldest column for safety

B. Average the columns nearest the actual temperature

C. Use only the warmest column listed

D. Use the column matching the actual temperature, interpolating if needed

38. A pilot computing climb time to a cruising altitude uses the chart's:

A. Crosswind component value

B. Rate of climb in feet per minute

C. Landing distance over a 50-foot obstacle

D. Never-exceed airspeed

39. Reading a chart, a pilot finds that increasing the headwind component:

A. Lengthens both the takeoff and landing distance

B. Shortens both the takeoff and landing distance

C. Has no effect on either distance

D. Lengthens takeoff but shortens landing

40. A pilot should interpret published performance figures as:

A. Guaranteed minimums the airplane will always beat

B. Values that include a built-in safety margin

C. Optimistic figures requiring an added real-world margin

D. Applicable only to operations at sea level

ANSWER KEY WITH EXPLANATIONS

1. C — Enter at the known condition and follow the guide lines in order. Performance charts are read by entering at a known value and tracking the guide lines through each correction to the result. The chart does not produce a single number without this process.

2. C — 7,400 feet. With a +20°C deviation from standard at 5,000 feet pressure altitude, density altitude is roughly 5,000 + (120 × 20) = 7,400 feet. The hot day pushes density altitude well above field elevation.

3. D — 13.9 knots. A 16-knot wind 60° off the runway gives a crosswind component of 16 × sin 60° ≈ 13.9 kt. Most of the wind is crosswind at this large angle.

4. C — 1,500 feet. Adding a 50% margin to a 1,000-foot book distance gives 1,500 feet. This conservatism accounts for real-world conditions worse than ideal.

5. C — 6 minutes. Climbing 3,000 feet at 500 fpm takes 3,000 ÷ 500 = 6 minutes. Rate of climb directly yields time to altitude.

6. D — 20 gallons. At 8 gph for 2.5 hours, fuel burned is 8 × 2.5 = 20 gallons. Cruise fuel is rate times time.

7. B — Ideal, with a new airplane and skilled pilot. Book figures assume ideal conditions, a new airplane, and a skilled pilot, so real performance is often worse. This is why a safety margin is added.

8. C — Exceeds the demonstrated crosswind component. A 13.9-knot crosswind is greater than the 12-knot demonstrated value, signaling a hazardous condition. The pilot should reconsider the runway or operation.

9. D — Pressure altitude and temperature. A density altitude chart converts pressure altitude and temperature into density altitude. Weight, wind, and airspeed are not its inputs.

10. B — 50 feet. Landing (and takeoff) distance charts commonly give total distance to clear a 50-foot obstacle, plus the ground roll. This standard obstacle height is built into the chart.

11. D — Entering at the wrong point yields an incorrect result. Charts must be entered at the exact given conditions; an inaccurate entry point produces a wrong distance or rate. The chart does not auto-correct inputs.

12. D — −1°C. Standard temperature at 8,000 feet is $15 - (2 \times 8) = -1$°C, using the 2°C-per-1,000-foot lapse rate. This is the baseline for density-altitude comparison.

13. C — Decreasing the ground roll needed. A headwind reduces the groundspeed needed to fly, shortening the takeoff roll. This is the benefit of departing into the wind.

14. C — 1,800 feet. With the altimeter at 30.12 (0.20 above standard 29.92), pressure altitude is below field elevation by about 200 feet: $2{,}000 - 200 = 1{,}800$ feet. Higher-than-standard pressure lowers pressure altitude.

15. A — Enters at the temperature, moves to the altitude line, then across through weight and wind references. The standard technique enters at temperature, moves up to the pressure-altitude line, then across through the weight and wind reference lines to the result. Each turn follows a guide line in sequence.

16. D — Longer than at sea level standard. Higher density altitude lengthens both takeoff and landing distances by thinning the air. Performance degrades across the board.

17. D — Different true airspeed and fuel flow values to read. A cruise table gives different TAS and fuel-flow values at each altitude and power setting, which the pilot reads for the chosen condition. It does not guarantee a uniform increase in fuel flow.

18. A — Acts perpendicular to the runway and must be controlled. The crosswind component is the part of the wind perpendicular to the runway, which the pilot must control during takeoff and landing. The headwind component is the parallel part.

19. B — Increased compared to a lighter weight. Greater weight lengthens the takeoff distance, as a heavier airplane needs more runway to reach flying speed. Weight is a key chart input.

20. A — 8 knots. A 16-knot wind 60° off the runway gives a headwind component of $16 \times \cos 60° = 8$ kt. The remaining ~13.9 kt is crosswind.

21. A — 29.92 inHg and reading the indicated altitude. Pressure altitude is the altitude shown when the altimeter is set to the standard datum of 29.92 inHg. It is the entry value for many performance charts.

22. D — Excess power available decreases with altitude. Climb rate falls with altitude because the excess power available shrinks as the air thins. The airplane does not gain weight as it climbs.

23. B — Actual performance is often worse than the ideal-condition figures. A margin is wise because real-world performance commonly falls short of the optimistic book figures. The charts are not overstated for safety.

24. D — Clearing a 50-foot obstacle plus the ground roll. Total landing distance includes the ground roll plus the distance to clear a 50-foot obstacle on approach. Ground roll alone is the shorter figure.

25. A — Thousands of feet higher than the field elevation. On a hot day at a high-elevation airport, density altitude can be thousands of feet above the actual field elevation, severely degrading performance. Planning for field elevation alone is dangerous.

26. B — The airplane's demonstrated crosswind capability. Wind components are computed to confirm the crosswind stays within the airplane's demonstrated capability. Exceeding it risks loss of directional control.

27. A — Mark where the pilot transitions to follow the next set of guide lines. A reference line marks where the pilot stops following one set of guide lines and begins following the next (e.g., from altitude to weight). It is part of the chart-reading sequence.

28. A — Reduce weight, wait for cooler air, or choose a longer runway. If the computed takeoff distance exceeds the runway, the safe options are reducing weight, waiting for cooler air, or using a longer runway. Attempting it anyway courts an overrun.

29. C — Increases above the indicated airspeed. At higher density altitude the thinner air means true airspeed exceeds indicated airspeed for a given reading. This affects approach and groundspeed planning.

30. A — A longer ground roll and reduced climb performance. High density altitude lengthens the ground roll and reduces climb, the worst combination for a short field. Careful planning is essential.

31. A — 29.92 inHg, the standard datum. Pressure altitude is read with the altimeter set to 29.92 inHg. The local setting yields indicated altitude, not pressure altitude.

32. C — Headwind and crosswind components. A wind component chart resolves a reported wind into its headwind and crosswind parts. It does not deal with airspeed or altitude conversions.

33. B — Temperature. A climb chart is entered with weight, altitude, and temperature to find the rate of climb. Crosswind and registration are not climb-chart inputs.

34. A — Treat the runway as marginal and reconsider the operation. A 1,000-foot book distance on a 1,100-foot runway leaves almost no margin, so the pilot should treat it as marginal and reconsider. Adding weight would worsen, not improve, the situation.

35. B — Increase the required takeoff distance. A tailwind raises the groundspeed needed to fly, lengthening the takeoff roll. This is why pilots avoid downwind takeoffs.

36. B — A higher altitude than its actual pressure altitude. A density altitude of 7,400 feet means the airplane performs as though at that higher altitude, even if its pressure altitude is lower. The thin air degrades performance accordingly.

37. D — Use the column matching the actual temperature, interpolating if needed. The pilot uses the column matching the actual temperature, interpolating between columns when the value falls in between. Defaulting to the coldest or warmest column gives an inaccurate result.

38. B — Rate of climb in feet per minute. Climb time to altitude is found from the chart's rate of climb in feet per minute, dividing the altitude to gain by that rate. Crosswind and landing figures are unrelated.

39. B — Shortens both the takeoff and landing distance. Increasing the headwind component shortens both takeoff and landing distances by reducing the required groundspeed. A tailwind would lengthen them.

40. C — Optimistic figures requiring an added real-world margin. Published figures are optimistic, ideal-condition values that warrant an added margin for real-world operations. They are not guaranteed minimums or pre-padded for safety.