PRACTICE EXAM 23

1. At a groundspeed of 100 knots on Leg 1 (60 NM), the time en route for that leg is:

A. 36 minutes

B. 60 minutes

C. 24 minutes

D. 50 minutes

2. Leg 2 (90 NM) is flown at a groundspeed of 90 knots. Its time en route is:

A. 45 minutes

B. 60 minutes

C. 90 minutes

D. 30 minutes

3. Leg 3 (50 NM) is flown at a groundspeed of 100 knots, taking:

A. 50 minutes

B. 30 minutes

C. 60 minutes

D. 20 minutes

4. The total time en route for all three legs combined is:

A. 100 minutes

B. 110 minutes

C. 126 minutes

D. 150 minutes

5. The total straight-line distance of the planned route is:

A. 90 nautical miles

B. 140 nautical miles

C. 150 nautical miles

D. 200 nautical miles

6. At 8 gallons per hour over the total en route time, the fuel burned (before reserve) is approximately:

A. 14.0 gallons

B. 16.8 gallons

C. 20.0 gallons

D. 24.0 gallons

7. Adding the required 30-minute day-VFR reserve to the en route fuel, the total fuel required is about:

A. 16.8 gallons

B. 18.0 gallons

C. 19.5 gallons

D. 20.8 gallons

8. Comparing the 20.8-gallon requirement to 26 gallons usable, the pilot should conclude the flight:

A. Cannot be completed without a fuel stop

B. Has no legal reserve requirement

C. Is impossible to plan in advance

D. Is within the available fuel with margin to spare

9. The average groundspeed for the entire 200-NM trip, given 126 minutes en route, is approximately:

A. 80 knots

B. 95 knots

C. 110 knots

D. 126 knots

10. Departing ABC at 1330Z with a total en route time of about 2 hours 6 minutes, the estimated time of arrival at XYZ is approximately:

A. 1430Z

B. 1500Z

C. 1530Z

D. 1536Z

11. On Leg 1, the true course is 045° with a wind from 360° at 20 knots and a true airspeed of 100 knots. The headwind component is approximately:

A. 20 knots

B. 0 knots

C. 7 knots

D. 14 knots

12. Continuing Leg 1, the crosswind component from that 20-knot wind at 45° to the course is approximately:

A. 20 knots

B. 0 knots

C. 14 knots

D. 7 knots

13. Using the Leg 1 crosswind of about 14 knots and a true airspeed of 100 knots, the wind correction angle is approximately:

A. 0°

B. 8°

C. 20°

D. 45°

14. With a 14-knot headwind on Leg 1, the groundspeed relative to the 100-knot true airspeed is approximately:

A. 100 knots

B. 86 knots

C. 114 knots

D. 50 knots

15. Applying the 8° wind correction angle to the 045° true course on Leg 1 (crabbing right into the wind), the true heading is approximately:

A. 053°

B. 037°

C. 045°

D. 090°

16. Converting the Leg 1 true heading of 053° using 8°E variation, the magnetic heading is:

A. 061°

B. 045°

C. 053°

D. 037°

17. The airplane's empty weight is 800 lb; maximum gross is 1,320 lb. With a 170-lb pilot, a 150-lb passenger, and 120 lb of fuel aboard, the remaining useful load for baggage is:

A. 200 pounds

B. 150 pounds

C. 80 pounds

D. 40 pounds

18. The 120 lb of fuel in Question 17 corresponds to how many gallons (at 6 lb/gal)?

A. 12 gallons

B. 15 gallons

C. 20 gallons

D. 26 gallons

19. As fuel burns off during the flight, the airplane's weight decreases, which generally causes the stall speed to:

A. Decrease as the flight progresses

B. Increase as the flight progresses

C. Remain exactly constant

D. Rise above the never-exceed speed

20. A 30-lb baggage item is moved from a baggage arm of 60 inches to a forward arm of 30 inches on a 1,200-lb airplane. The CG shifts approximately:

A. 0.75 inch aft

B. 1.5 inches aft

C. 0.75 inch forward

D. No measurable change

21. Planning the climb, the airplane must reach a cruising altitude 4,500 feet above the departure field. At a 600-fpm rate of climb, the climb takes:

A. 4.5 minutes

B. 6.0 minutes

C. 9.0 minutes

D. 7.5 minutes

22. Planning the descent into XYZ from cruise, a 3,000-foot descent at 500 fpm requires:

A. 6 minutes

B. 9 minutes

C. 3 minutes

D. 15 minutes

23. A pilot computing the top-of-climb point should begin the descent into the destination:

A. Only after passing directly over the airport

B. At the last possible moment to save fuel

C. Far enough out to arrive at pattern altitude comfortably

D. Immediately after reaching cruising altitude

24. The pilot notes the en route weather at the midpoint is forecast to deteriorate. The best planning practice is to:

A. Plan to climb above the weather on instruments

B. Ignore it, since the destination forecast is good

C. Increase cruise speed to outrun the weather

D. Identify a divert airport along the route in advance

25. When selecting checkpoints for pilotage along each leg, a pilot should choose features that are:

A. Small and difficult to distinguish from the air

B. Located only at the departure and destination airports

C. Spaced exactly one nautical mile apart

D. Prominent, unique, and easy to identify from the air

26. The pilot computes that Leg 2 has a direct headwind, while Leg 1 had a partial headwind. The headwind on Leg 2 will, compared to a no-wind condition:

A. Increase the time and fuel for that leg

B. Decrease the time and fuel for that leg

C. Have no effect on time or fuel

D. Eliminate the need for a reserve

27. A pilot completing a navigation log records, for each leg, the:

A. Heading, distance, groundspeed, time, and fuel

B. Pilot's certificate number and medical class

C. Aircraft's resale value and registration history

D. Names of all passengers aboard

28. Before departure, the pilot checks NOTAMs and finds a temporary tower outage at the destination. The pilot should:

A. Cancel the flight, since a tower is required

B. Disregard it, since NOTAMs are advisory

C. File an instrument flight plan instead

D. Plan to use non-towered (CTAF) procedures at the destination

29. A pilot computing weight and balance finds the loaded airplane is within gross weight but the CG is slightly aft of the rear limit. The correct action is to:

A. Depart, since total weight is acceptable

B. Shift weight forward to bring the CG within limits

C. Add fuel to the rear tanks to balance the load

D. Increase the cruising altitude to compensate

30. A pilot plans fuel for the trip and discovers the total required, with reserve, leaves only a 5-gallon margin. The prudent planning response is to:

A. Reduce the planned reserve to gain more margin

B. Plan a fuel stop or reduce weight to increase the margin

C. Depart anyway, since the reserve is technically met

D. Disregard the margin, since fuel gauges are conservative

31. A pilot determines the true course for each leg by measuring on the sectional from:

A. Magnetic north using the compass rose

B. The destination back to the departure point

C. True north using the lines of longitude

D. The nearest VOR radial only

32. The pilot applies variation to convert true course to magnetic course using:

A. The isogonic line value nearest each leg

B. The Maximum Elevation Figure in the quadrant

C. The airport field elevation

D. The aircraft's compass deviation card only

33. A pilot computing fuel must account not only for cruise but also for:

A. The aircraft's resale value over time

B. Taxi, takeoff, climb, and the required reserve

C. The passenger's individual weight only

D. The destination's runway length

34. A pilot finds that a strong forecast tailwind on the return leg will:

A. Increase groundspeed and reduce the return time

B. Decrease groundspeed and increase the return time

C. Have no effect on the return flight

D. Require a larger fuel reserve than the outbound leg

35. During planning, the pilot calculates that fuel burned reduces aircraft weight in flight, which shifts the CG. The pilot should verify the CG remains in limits:

A. Only at the start of the flight

B. Only at the end of the flight

C. Throughout the flight, at both takeoff and landing weights

D. Only if a passenger changes seats

36. A pilot selecting a cruising altitude for a westbound VFR flight above 3,000 feet AGL should choose:

A. An even thousand foot MSL altitude plus 500 feet

B. An odd thousand foot MSL altitude plus 500 feet

C. Any altitude, since the rule applies only to IFR

D. The highest altitude the airplane can reach

37. A pilot's navigation log shows the estimated time to the first checkpoint. In flight, comparing actual to estimated time allows the pilot to:

A. Change the aircraft's empty weight

B. Recompute the magnetic variation

C. Adjust the compass deviation card

D. Revise the groundspeed and update the ETA

38. A pilot finds the destination field elevation is 2,500 feet MSL and a hot day yields a high density altitude. The pilot should plan for:

A. A longer landing distance than at sea level

B. A shorter landing roll due to thinner air

C. No change from standard-day performance

D. A reduced stall speed on landing

39. A pilot must compute the point of no return or a suitable alternate when:

A. The flight is shorter than 50 nautical miles

B. The destination weather is forecast clear

C. Fuel margin and weather make a diversion plan prudent

D. The aircraft has a controllable-pitch propeller

40. Completing the plan, the pilot's final preflight action regarding the computed numbers is to:

A. Discard the navigation log once airborne

B. Assume the figures need no verification in flight

C. Cross-check actual performance against the plan and adjust as needed

D. Rely solely on the autopilot to fly the plan

ANSWER KEY WITH EXPLANATIONS

1. A — 36 minutes. Leg 1 time is 60 NM ÷ 100 kt = 0.6 hr = 36 minutes. Groundspeed drives leg time.

2. B — 60 minutes. Leg 2 time is 90 NM ÷ 90 kt = 1.0 hr = 60 minutes. Equal distance and groundspeed yield one hour.

3. B — 30 minutes. Leg 3 time is 50 NM ÷ 100 kt = 0.5 hr = 30 minutes. The same time-speed-distance relationship applies.

4. C — 126 minutes. Summing the legs: 36 + 60 + 30 = 126 minutes (2 hr 6 min). Total trip time is the sum of the leg times.

5. D — 200 nautical miles. The route totals 60 + 90 + 50 = 200 nautical miles. This is the sum of the leg distances.

6. B — 16.8 gallons. En route fuel is 2.1 hr × 8 gph = 16.8 gallons, before reserve. Rate times total time gives the burn.

7. D — 20.8 gallons. Adding a 30-minute reserve (0.5 × 8 = 4 gal) to the 16.8-gallon burn gives 20.8 gallons. Reserve must always be included.

8. D — Is within the available fuel with margin to spare. The 20.8-gallon requirement is comfortably under the 26 gallons usable, leaving about 5 gallons of extra margin. The flight is feasible as planned.

9. B — 95 knots. Average groundspeed is 200 NM ÷ 2.1 hr ≈ 95 knots. Total distance divided by total time gives the average.

10. D — 1536Z. Adding 2 hours 6 minutes to a 1330Z departure gives about 1536Z. ETA is departure plus total time en route.

11. D — 14 knots. A 20-knot wind 45° off the course gives a headwind component of 20 × cos 45° ≈ 14 knots. The cosine term governs the headwind portion.

12. C — 14 knots. The same 20-knot wind at 45° gives a crosswind component of 20 × sin 45° ≈ 14 knots. At 45°, headwind and crosswind components are equal.

13. B — 8°. The wind correction angle is about arcsin(14 ÷ 100) ≈ 8°. The crab offsets the crosswind to hold track.

14. B — 86 knots. Subtracting the 14-knot headwind from the 100-knot true airspeed gives a groundspeed of about 86 knots. A headwind reduces groundspeed.

15. A — 053°. Crabbing 8° right into the wind, true heading is 045 + 8 = 053°. The correction angle is added when crabbing right.

16. B — 045°. Applying 8°E variation to a true heading of 053° gives 053 − 8 = 045° ("east is least"). Easterly variation is subtracted.

17. C — 80 pounds. Useful load is 1,320 − 800 = 520 lb; subtracting pilot (170), passenger (150), and fuel (120) leaves 520 − 440 = 80 lb for baggage. Each item draws from the same useful load.

18. C — 20 gallons. At 6 lb/gal, 120 lb of fuel is 120 ÷ 6 = 20 gallons. Fuel weight converts to volume by the per-gallon weight.

19. A — Decrease as the flight progresses. As fuel burns, weight decreases, which lowers the stall speed over the flight. A lighter wing stalls at a lower speed.

20. C — 0.75 inch forward. Moving 30 lb from arm 60 to arm 30 changes the moment by 30 × (30 − 60) = −900 in-lb; dividing by 1,200 lb gives a 0.75-inch forward shift. Moving weight forward moves the CG forward.

21. D — 7.5 minutes. Climbing 4,500 ft at 600 fpm takes 4,500 ÷ 600 = 7.5 minutes. Rate of climb yields time to altitude.

22. A — 6 minutes. Descending 3,000 ft at 500 fpm takes 3,000 ÷ 500 = 6 minutes. The same rate relationship governs descent time.

23. C — Far enough out to arrive at pattern altitude comfortably. The descent should begin far enough from the airport to reach pattern altitude comfortably, not over the field or at the last moment. Planning the top-of-descent avoids a rushed arrival.

24. D — Identify a divert airport along the route in advance. With forecast deterioration at the midpoint, the prudent practice is to identify a divert airport in advance. Climbing on instruments or outrunning weather is not an option for a day-VFR Sport Pilot.

25. D — Prominent, unique, and easy to identify from the air. Good pilotage checkpoints are prominent, unique, and easily identified from the air. Small or ambiguous features make navigation unreliable.

26. A — Increase the time and fuel for that leg. A direct headwind on Leg 2 lowers groundspeed, increasing the time and fuel for that leg. A headwind always costs time and fuel.

27. A — Heading, distance, groundspeed, time, and fuel. A navigation log records, per leg, the heading, distance, groundspeed, time, and fuel. Passenger names and resale values are not part of it.

28. D — Plan to use non-towered (CTAF) procedures at the destination. A temporary tower outage means the airport operates as non-towered, so the pilot plans CTAF procedures. The flight need not be canceled or flown IFR.

29. B — Shift weight forward to bring the CG within limits. With the CG aft of the rear limit, the pilot must shift weight forward to bring it within limits before flight. Acceptable total weight does not excuse an out-of-limits CG.

30. B — Plan a fuel stop or reduce weight to increase the margin. A thin 5-gallon margin warrants planning a fuel stop or reducing weight for a safer cushion. Cutting the reserve or trusting the gauges is unwise.

31. C — True north using the lines of longitude. True course is measured against true north using the lines of longitude on the sectional. Variation is applied afterward to get magnetic course.

32. A — The isogonic line value nearest each leg. Variation is taken from the isogonic line value nearest each leg to convert true to magnetic course. The MEF, field elevation, and deviation card serve other purposes.

33. B — Taxi, takeoff, climb, and the required reserve. Fuel planning must include taxi, takeoff, climb, and the required reserve, not just cruise. Omitting these underestimates the fuel needed.

34. A — Increase groundspeed and reduce the return time. A tailwind on the return raises groundspeed, shortening the return time and fuel. A tailwind always helps.

35. C — Throughout the flight, at both takeoff and landing weights. Because burning fuel shifts the CG, the pilot verifies it stays in limits at both takeoff and landing weights. Checking only one end could miss an out-of-limits condition.

36. A — An even thousand foot MSL altitude plus 500 feet. Westbound VFR cruising above 3,000 feet AGL uses even thousands plus 500 feet (e.g., 4,500). Eastbound uses odd thousands plus 500.

37. D — Revise the groundspeed and update the ETA. Comparing actual to estimated time at a checkpoint lets the pilot recompute groundspeed and update the ETA. This is the core of en route navigation.

38. A — A longer landing distance than at sea level. A high density altitude at a 2,500-foot field lengthens the landing distance compared to sea level, since the airplane lands at a higher true airspeed. Planning for the longer roll is essential.

39. C — Fuel margin and weather make a diversion plan prudent. A point-of-no-return or alternate plan is prudent when fuel margin and weather warrant it. It is not tied to short flights, clear forecasts, or propeller type.

40. C — Cross-check actual performance against the plan and adjust as needed. The plan's value is realized by cross-checking actual performance against it in flight and adjusting as needed. Discarding the log or trusting the numbers blindly defeats the planning.