SESSION 81: MIXED SCENARIO — FULL CHECKRIDE SIMULATION: SYSTEMS, WEATHER, AND EMERGENCY

Scenario thread: You are flying N740SW IFR. The DPE introduces deteriorating weather and systems failures, testing your decisions.

1. Before departure, you review the destination forecast and notice it is trending toward lower ceilings and visibility through your ETA. The prudent response is to:

A. File a suitable alternate and plan extra fuel, reassessing the trend

B. Depart and decide later

C. Cancel the alternate

D. Disregard the trend

2. En route, you receive a SIGMET for embedded thunderstorms along your route. A SIGMET indicates:

A. Light turbulence only

B. A routine forecast

C. Weather significant to all aircraft (e.g., severe conditions, embedded thunderstorms, severe icing)

D. VFR conditions

3. Encountering the convective area, the safest action is to:

A. Penetrate the cell to save time

B. Deviate around the convective weather, requesting a clearance change from ATC

C. Descend below it

D. Climb over it

4. You also receive a PIREP of moderate rime icing at your altitude. Rime ice forms from:

A. Large supercooled droplets

B. Warm rain

C. Dry air

D. Small supercooled droplets freezing on contact, producing a rough, opaque deposit

5. Your aircraft is not certified for flight into known icing. Encountering the icing, you should:

A. Continue and rely on pitot heat

B. Exit the icing by changing altitude or course to warmer or clear air, and advise ATC

C. Increase speed only

D. Descend into colder air

6. As you manage the weather, you notice the suction (vacuum) gauge has dropped below the normal range and the attitude indicator is beginning to show subtle errors. This indicates:

A. A pitot blockage

B. An electrical failure

C. A vacuum system failure — the vacuum-driven gyros are becoming unreliable

D. A transponder failure

7. The danger of this failure is that it is:

A. Insidious — the attitude and heading indicators degrade slowly and can mislead you into an unusual attitude

B. Immediate and obvious

C. Limited to the radios

D. Limited to the engine

8. Recognizing the failure, you transition to partial-panel flying, using the:

A. Failed attitude indicator

B. Heading indicator

C. GPS

D. Turn coordinator, pitot-static instruments, and magnetic compass

9. On partial panel, you obtain pitch information from the:

A. Turn coordinator

B. Heading indicator

C. Magnetic compass

D. Altimeter, VSI, and airspeed indicator

10. You advise ATC of the vacuum failure and the weather. To reduce workload on the approach, you should request:

A. A circling approach

B. Radar vectors to a long, straight-in final (and consider no-gyro vectors)

C. A procedure turn

D. A holding pattern

11. Given the deteriorating destination weather and your degraded panel, the wise decision is to:

A. Divert to an airport with better weather and the simplest available approach, while fuel permits

B. Continue to the original destination regardless

C. Hold until the weather improves

D. Descend below minimums

12. Reassessing fuel at this decision point, you must ensure you can reach the chosen airport and land with:

A. No reserves

B. The taxi fuel

C. The required reserves

D. The departure fuel

13. You elect to declare an emergency due to the combination of factors. Declaring an emergency:

A. Cancels your IFR clearance

B. Gives you priority handling and access to ATC assistance

C. Requires squawking 7500

D. Is inappropriate here

14. ATC offers no-gyro vectors for the approach. On a no-gyro approach, you make turns at:

A. Maximum bank

B. Standard rate above the FAF

C. Standard rate (and half standard rate below the FAF), on the instruction "turn left/right" until "stop turn"

D. No turns at all

15. Flying the partial-panel approach, you keep it stabilized because:

A. The minimums are lower

B. The compass works better

C. The autopilot requires it

D. Large corrections are harder to manage and more destabilizing with the reduced instrument reference

16. Your autopilot uses the failed attitude/heading gyros for its reference. You should:

A. Use it on final only

B. Trust it fully

C. Use it for the missed approach

D. Not use it, since it would follow the erroneous reference

17. You reach the DA on the partial-panel approach without the required visual references. You must:

A. Execute the missed approach

B. Descend to find the runway

C. Level off and continue

D. Land

18. The partial-panel missed approach is demanding because you must simultaneously:

A. Use the attitude indicator

B. Land regardless

C. Climb, configure, and navigate using the cross-check without the primary attitude/heading references

D. Disregard the turn coordinator

19. During the missed approach climb on partial panel, you set the climb pitch using:

A. The attitude indicator

B. Power and the pitot-static instruments showing the climb

C. The heading indicator

D. The magnetic compass

20. Throughout this multi-failure scenario, your unchanging first priority is to:

A. Aviate — maintain aircraft control

B. Communicate with ATC

C. Navigate to the alternate

D. Configure the aircraft

21. Your authority as PIC under §91.3 in this emergency allows you to:

A. Ignore all regulations permanently

B. Cancel IFR only

C. Deviate from any rule to the extent required to meet the emergency

D. Change your certificate

22. Good aeronautical decision-making throughout this scenario is demonstrated by:

A. Pressing on to the original plan

B. Ignoring the weather and failures

C. Relying solely on the autopilot

D. Recognizing the accumulating risks early and making conservative, timely decisions (divert, declare, simplify the approach)

23. The combination of weather, a systems failure, and a degraded panel illustrates the concept of:

A. A single point of failure

B. An accident chain — multiple factors compounding, which the pilot must break with sound decisions

C. A routine flight

D. An equipment malfunction only

24. After landing safely, your postflight responsibilities include:

A. Documenting the vacuum failure (a squawk/write-up) so it is repaired before the next IFR flight

B. Filing a new flight plan

C. Renewing the medical

D. Logging the alternate only

25. The fundamental principle this final scenario tests is that the instrument pilot must:

A. Memorize procedures without judgment

B. Integrate weather assessment, systems knowledge, emergency procedures, and aeronautical decision-making — maintaining control, breaking the accident chain, and making conservative decisions to complete the flight safely

C. Continue the original plan regardless

D. Rely on automation in all failures

ANSWER KEY & EXPLANATIONS – SESSION 81

1. A. File alternate/extra fuel — A deteriorating destination forecast calls for filing a suitable alternate and planning extra fuel, reassessing the trend.

2. C. Significant weather — A SIGMET indicates weather significant to all aircraft (e.g., severe conditions, embedded thunderstorms, severe icing).

3. B. Deviate around — The safest action in a convective area is to deviate around the convective weather, requesting a clearance change from ATC.

4. D. Small droplets/rough opaque — Rime ice forms from small supercooled droplets freezing on contact, producing a rough, opaque deposit.

5. B. Exit the icing — Not certified for known icing, the pilot should exit the icing by changing altitude or course to warmer or clear air, and advise ATC.

6. C. Vacuum failure — A dropped suction gauge and a subtly erring attitude indicator indicate a vacuum system failure — the vacuum-driven gyros are becoming unreliable.

7. A. Insidious — The danger is that it is insidious — the AI and HI degrade slowly and can mislead the pilot into an unusual attitude.

8. D. TC/pitot-static/compass — On partial panel, the pilot uses the turn coordinator, pitot-static instruments, and magnetic compass.

9. D. Alt/VSI/ASI — Pitch information on partial panel comes from the altimeter, VSI, and airspeed indicator.

10. B. Vectors to straight-in — To reduce workload, the pilot requests radar vectors to a long, straight-in final (and considers no-gyro vectors).

11. A. Divert/simplest approach — Given the weather and degraded panel, the wise decision is to divert to an airport with better weather and the simplest approach, while fuel permits.

12. C. Required reserves — The pilot must ensure reaching the chosen airport and landing with the required reserves.

13. B. Priority/assistance — Declaring an emergency gives priority handling and access to ATC assistance.

14. C. Standard/half-standard rate — On a no-gyro approach, turns are made at standard rate (and half standard rate below the FAF), on "turn left/right" until "stop turn."

15. D. Hard to recover corrections — A stabilized partial-panel approach matters because large corrections are harder to manage and more destabilizing with the reduced instrument reference.

16. D. Don't use it — Since the autopilot uses the failed gyros for reference, the pilot should not use it, as it would follow the erroneous reference.

17. A. Missed approach — Reaching the DA without the required visual references, the pilot executes the missed approach.

18. C. Climb/configure/navigate via cross-check — The partial-panel missed approach is demanding because the pilot must simultaneously climb, configure, and navigate using the cross-check without the primary references.

19. B. Power + pitot-static — The climb pitch on partial panel is set using power and the pitot-static instruments showing the climb.

20. A. Aviate — Throughout the scenario, the unchanging first priority is to aviate — maintain aircraft control.

21. C. Deviate for emergency — §91.3 allows the PIC to deviate from any rule to the extent required to meet the emergency.

22. D. Recognize/conservative/timely — Good ADM is demonstrated by recognizing the accumulating risks early and making conservative, timely decisions.

23. B. Accident chain — The combination of factors illustrates an accident chain — multiple factors compounding, which the pilot must break with sound decisions.

24. A. Document the failure — Postflight, the pilot documents the vacuum failure (a squawk/write-up) so it is repaired before the next IFR flight.

25. B. Integrate/control/break the chain — The final scenario tests integrating weather assessment, systems knowledge, emergency procedures, and ADM — maintaining control, breaking the accident chain, and making conservative decisions to complete the flight safely.