SESSION 74: EMERGENCIES — PITOT-STATIC FAILURE AND UNRELIABLE AIRSPEED PROCEDURES

1. The pitot-static system supplies ram-air and static pressure to which instruments?

A. The attitude indicator and heading indicator

B. The turn coordinator and AI

C. The magnetic compass only

D. The airspeed indicator, altimeter, and vertical speed indicator

2. The airspeed indicator measures airspeed by comparing:

A. Static pressure to cabin pressure

B. Two static sources

C. Ram pressure to ram pressure

D. Ram (pitot) pressure against static pressure

3. If the pitot tube ram-air inlet becomes blocked but the pitot drain hole remains open, the airspeed indicator will:

A. Read high

B. Be unaffected

C. Drop toward zero as the trapped pressure bleeds out the drain

D. Freeze at the current reading

4. If both the pitot ram-air inlet and the drain hole are blocked (trapping the pressure), the airspeed indicator will then behave like:

A. A normal ASI

B. A VSI

C. A turn coordinator

D. An altimeter — reading higher in a climb and lower in a descent as static pressure changes

5. This "ASI acts like an altimeter" behavior with a fully blocked pitot system occurs because:

A. With ram pressure trapped, only the changing static pressure affects the reading

B. The static port is blocked

C. The VSI fails

D. The drain is open

6. Pitot ice is the most common cause of pitot blockage, which is why aircraft are equipped with:

A. An alternate static source

B. Pitot heat

C. A backup ASI

D. A vacuum pump

7. If the static port becomes blocked (pitot clear), the altimeter will:

A. Freeze at the altitude where the blockage occurred

B. Read zero

C. Read higher continuously

D. Become more sensitive

8. With a blocked static port, the vertical speed indicator will:

A. Read the correct climb rate

B. Read a continuous climb

C. Read a continuous descent

D. Read zero (no change), since static pressure cannot change

9. With a blocked static port, the airspeed indicator will be:

A. Frozen

B. Reading zero

C. Inaccurate — reading low in a climb and high in a descent, since the trapped static no longer matches the changing pitot pressure

D. Unaffected

10. The remedy for a blocked static port is to:

A. Apply pitot heat

B. Turn off the avionics

C. Select the alternate static source

D. Descend immediately

11. Many aircraft provide an alternate static source that draws static pressure from:

A. Outside the aircraft

B. The pitot tube

C. The engine

D. Inside the cabin (e.g., the cockpit)

12. When using a cabin (unvented) alternate static source, the lower cabin pressure typically causes the altimeter to read:

A. Lower than actual and the airspeed to read lower

B. Slightly higher than actual and the airspeed slightly high

C. Exactly correct

D. Zero

13. If no alternate static source is installed, an emergency method to restore static pressure is to:

A. Break the glass of the VSI (in an unpressurized aircraft), admitting cabin static pressure

B. Apply pitot heat

C. Turn off the master

D. Open the pitot drain

14. Breaking the VSI face as an emergency static source renders the:

A. VSI unusable, but restores rough static input to the altimeter and ASI

B. Altimeter unusable

C. ASI unusable

D. Attitude indicator unusable

15. When the airspeed indicator is unreliable, the pilot can maintain a safe, known airspeed by using:

A. The magnetic compass

B. The VSI alone

C. Known pitch attitude and power settings for the desired performance

D. The turn coordinator

16. Flying "pitch plus power equals performance" with a failed ASI means the pilot:

A. Ignores the attitude indicator

B. Uses only the altimeter

C. Sets a known pitch attitude on the AI and a known power setting to produce a predictable airspeed

D. Descends to find the speed

17. A pilot who suspects an unreliable airspeed indication should first:

A. Disregard all instruments

B. Pull the airspeed circuit breaker

C. Land immediately

D. Cross-check the ASI against the other instruments (attitude, altimeter, power, sound, feel) to detect the discrepancy

18. Recognizing pitot-static failures early in IMC is critical because:

A. The attitude indicator fails too

B. A false airspeed or altitude can lead to a stall, overspeed, or altitude deviation if trusted

C. The vacuum system depends on it

D. The transponder will fail

19. A blocked pitot during a descent (fully blocked system) would cause the ASI to indicate:

A. A higher airspeed

B. The correct airspeed

C. A lower airspeed (mirroring the falling static pressure like an altimeter would fall)

D. Zero

20. A pilot noticing the ASI increasing in a climb at constant pitch/power should suspect:

A. A vacuum failure

B. A blocked pitot system (ASI behaving like an altimeter)

C. A static blockage

D. An electrical failure

21. The first corrective actions for a suspected pitot blockage include:

A. Turning on pitot heat and considering the alternate static source if static is also affected

B. Pulling the static line

C. Turning off the master

D. Breaking the altimeter glass

22. When all airspeed information is lost, maintaining aircraft control in IMC relies most on:

A. The magnetic compass

B. The attitude indicator (pitch and bank) plus power

C. The VSI

D. The DME

23. A pilot should brief the pitch/power settings for cruise, climb, descent, and approach so that:

A. The transponder is set

B. The vacuum is checked

C. They can fly the aircraft accurately if the airspeed becomes unreliable

D. The alternate is selected

24. Confirming the altimeter is affected by a static blockage can be done by:

A. Selecting the alternate static source and observing whether the indications correct/change

B. Applying pitot heat

C. Checking the vacuum gauge

D. Pulling the ASI breaker

25. The fundamental principle of handling pitot-static failures is that the pilot must:

A. Trust the airspeed indicator regardless

B. Recognize the abnormal indications via cross-check, apply the correct remedy (pitot heat/alternate static), and fly known pitch-and-power to maintain safe control until landing

C. Descend immediately in all cases

D. Disregard the altimeter

ANSWER KEY & EXPLANATIONS – SESSION 74

1. D. ASI/altimeter/VSI — The pitot-static system supplies the airspeed indicator, altimeter, and vertical speed indicator.

2. D. Ram vs. static — The ASI measures airspeed by comparing ram (pitot) pressure against static pressure.

3. C. Drops to zero — With the ram inlet blocked but the drain open, the ASI drops toward zero as the trapped pressure bleeds out.

4. D. Acts like an altimeter — With both the inlet and drain blocked, the ASI behaves like an altimeter — reading higher in a climb and lower in a descent.

5. A. Only static changes — The "acts like an altimeter" behavior occurs because, with ram pressure trapped, only the changing static pressure affects the reading.

6. B. Pitot heat — Pitot ice is the most common cause of pitot blockage, so aircraft are equipped with pitot heat.

7. A. Freezes — A blocked static port freezes the altimeter at the altitude where the blockage occurred.

8. D. Reads zero — A blocked static port causes the VSI to read zero (no change), since static pressure cannot change.

9. C. Low in climb/high in descent — With a blocked static port, the ASI is inaccurate — reading low in a climb and high in a descent.

10. C. Alternate static — The remedy for a blocked static port is to select the alternate static source.

11. D. Cabin — An alternate static source typically draws static pressure from inside the cabin.

12. B. Slightly high — A cabin (unvented) alternate static source typically causes the altimeter and airspeed to read slightly higher than actual, due to lower cabin pressure.

13. A. Break the VSI glass — Without an alternate static source, an emergency method is to break the VSI glass (in an unpressurized aircraft), admitting cabin static pressure.

14. A. VSI lost, others restored — Breaking the VSI face renders the VSI unusable but restores rough static input to the altimeter and ASI.

15. C. Pitch + power — With an unreliable ASI, the pilot maintains a safe airspeed using known pitch attitude and power settings.

16. C. Set pitch + power — "Pitch plus power equals performance" means setting a known pitch attitude on the AI and a known power setting to produce a predictable airspeed.

17. D. Cross-check — Suspecting an unreliable ASI, the pilot first cross-checks it against the other instruments to detect the discrepancy.

18. B. False data → stall/overspeed — Early recognition is critical because a false airspeed or altitude can lead to a stall, overspeed, or altitude deviation if trusted.

19. C. Lower in descent — A fully blocked pitot during a descent causes the ASI to indicate a lower airspeed (mirroring the falling static pressure).

20. B. Blocked pitot — An ASI increasing in a climb at constant pitch/power suggests a blocked pitot system (ASI behaving like an altimeter).

21. A. Pitot heat/alternate static — The first corrective actions for a suspected pitot blockage include turning on pitot heat and considering the alternate static source if static is also affected.

22. B. Attitude + power — With all airspeed lost, control in IMC relies most on the attitude indicator (pitch and bank) plus power.

23. C. Fly accurately if ASI fails — Briefing the pitch/power settings lets the pilot fly accurately if the airspeed becomes unreliable.

24. A. Select alternate static — A static blockage's effect on the altimeter can be confirmed by selecting the alternate static source and observing whether the indications correct/change.

25. B. Recognize/remedy/pitch-power — The fundamental principle is to recognize the abnormal indications via cross-check, apply the correct remedy, and fly known pitch-and-power to maintain safe control until landing.