SESSION 40: INSTRUMENT FLIGHT — ATTITUDE FLYING: STRAIGHT-AND-LEVEL, CLIMBS, DESCENTS

1. Attitude instrument flying is fundamentally the technique of controlling the aircraft by:

A. Reference to outside visual cues

B. Following ATC vectors exclusively

C. Using the magnetic compass alone

D. Establishing attitude and power on the instruments to produce a desired performance

2. Pitch attitude on the attitude indicator primarily controls:

A. The aircraft's heading

B. The bank angle

C. The roll rate

D. Airspeed and altitude (in combination with power)

3. Bank attitude on the attitude indicator primarily controls:

A. The rate and direction of turn (heading change)

B. The airspeed

C. The vertical speed

D. The engine power

4. To maintain straight-and-level flight, the pilot sets:

A. A nose-high pitch and reduced power

B. Wings level and a pitch attitude that holds altitude, with power for the desired airspeed

C. A bank angle of 15 degrees

D. Full power with a nose-down attitude

5. A standard-rate turn is defined as a turn of:

A. 1 degree per second

B. 3 degrees per second (360 degrees in 2 minutes)

C. 6 degrees per second

D. 10 degrees per second

6. A useful rule of thumb for the bank angle required for a standard-rate turn is:

A. Bank angle equals the airspeed in knots

B. Bank angle equals 30 degrees regardless of speed

C. Approximately the true airspeed (in knots) divided by 10, then plus 7 (or 5–7)

D. Bank angle equals half the airspeed

7. At approximately 100 knots, the bank angle for a standard-rate turn is roughly:

A. 17 degrees (about TAS/10 + 7)

B. 30 degrees

C. 45 degrees

D. 10 degrees

8. To enter a constant-airspeed climb from level flight, the pilot:

A. Raises the pitch to the climb attitude and adds power as appropriate, then trims

B. Adds full power only, with no pitch change

C. Lowers the nose and reduces power

D. Banks the aircraft 30 degrees

9. In a constant-rate descent, the pilot controls the descent rate primarily with:

A. The bank angle

B. The heading indicator

C. The magnetic compass

D. Pitch, supported by power, referencing the VSI/altimeter

10. When rolling out of a turn onto a desired heading, the pilot should begin the rollout:

A. After passing the target heading

B. Exactly at the target heading

C. Before reaching the target heading, by roughly half the bank angle in degrees

D. Only when the heading indicator stops moving

11. "Pitch + power = performance" applies in attitude instrument flying such that, for a constant altitude at a higher airspeed, the pilot:

A. Adds power and lowers pitch to hold altitude

B. Reduces power and raises pitch

C. Banks the aircraft

D. Increases the bank angle

12. Trim is applied during attitude instrument flying to:

A. Set the navigation course

B. Replace the attitude indicator

C. Change the heading

D. Relieve control pressures so the aircraft holds the set attitude with minimal input

13. To level off from a climb at a target altitude, the pilot should begin lowering the pitch:

A. After reaching the target altitude

B. Exactly at the target altitude

C. 500 feet before the target regardless of climb rate

D. Approaching the altitude, leading by roughly 10% of the vertical speed

14. During a standard-rate turn at constant altitude, the slight loss of vertical lift component is compensated by:

A. Reducing power

B. Increasing the bank angle

C. A small increase in pitch (back pressure) to hold altitude

D. Lowering the nose

15. Over-controlling in attitude instrument flying is best avoided by:

A. Making large, rapid corrections

B. Fixating on the VSI

C. Making small, smooth control inputs and allowing the aircraft to respond before adjusting further

D. Ignoring the attitude indicator

16. The relationship between pitch and airspeed at a constant power setting is that:

A. Raising pitch increases airspeed

B. Raising pitch (nose-up) decreases airspeed and tends to climb

C. Pitch has no effect on airspeed

D. Lowering pitch decreases airspeed

17. A constant-airspeed descent at idle power is controlled by:

A. Power changes alone

B. Adjusting pitch to maintain the target airspeed, accepting the resulting descent rate

C. Banking the aircraft

D. Trimming nose-up only

18. When entering a turn, coordinated use of aileron and rudder ensures:

A. The turn is at standard rate automatically

B. The airspeed remains constant

C. The altitude does not change

D. The ball remains centered (coordinated flight), avoiding slip or skid

19. A change in power setting in level flight, with pitch held constant, will tend to:

A. Change the heading

B. Change the bank angle

C. Change the airspeed and require a pitch adjustment to hold altitude

D. Have no effect

20. Precise altitude control in level flight depends most on:

A. Establishing and holding a consistent pitch attitude on the attitude indicator

B. Frequent large power changes

C. Constant bank adjustments

D. Watching only the VSI

21. To maintain a constant airspeed in a climb, if the airspeed is decreasing the pilot should:

A. Add power without changing pitch

B. Increase the bank angle

C. Lower the pitch slightly to regain the target airspeed

D. Raise the pitch further

22. The fundamental maneuvers of attitude instrument flying are:

A. Spins, stalls, and spirals

B. Straight-and-level, climbs, descents, and turns

C. Holding entries only

D. Approaches and missed approaches only

23. A coordinated standard-rate turn is verified by the turn coordinator showing the standard-rate index and:

A. The altimeter increasing

B. The ball centered

C. The airspeed increasing

D. The heading constant

24. Smoothness and precision in attitude instrument flying come primarily from:

A. Aggressive control inputs

B. Memorizing the navigation chart

C. A disciplined cross-check combined with small, smooth control and power adjustments and proper trim

D. Relying solely on the autopilot

25. The fundamental objective of attitude instrument flying is to:

A. Precisely control the aircraft's flight path by reference to instruments through deliberate attitude and power management

B. Eliminate the need for a cross-check

C. Replace navigation procedures

D. Maintain control using outside visual references

ANSWER KEY & EXPLANATIONS — SESSION 40

1. D. Attitude + power for performance — Attitude instrument flying establishes attitude and power on the instruments to produce a desired performance.

2. D. Airspeed/altitude with power — Pitch attitude, in combination with power, primarily controls airspeed and altitude.

3. A. Rate/direction of turn — Bank attitude primarily controls the rate and direction of turn (heading change).

4. B. Wings level, hold altitude — Straight-and-level flight is wings level with a pitch attitude that holds altitude and power for the desired airspeed.

5. B. 3°/sec — A standard-rate turn is 3 degrees per second (360 degrees in 2 minutes).

6. C. TAS/10 + 7 — The rule of thumb for standard-rate bank is approximately TAS (knots) divided by 10, plus 5–7.

7. A. ~17° — At 100 knots, the standard-rate bank is roughly 100/10 + 7 = 17 degrees.

8. A. Raise pitch/add power/trim — Entering a constant-airspeed climb, the pilot raises pitch to the climb attitude, adds power as appropriate, then trims.

9. D. Pitch with power/VSI — Descent rate is controlled primarily with pitch, supported by power, referencing the VSI/altimeter.

10. C. Lead by half bank — The rollout begins before the target heading, by roughly half the bank angle in degrees.

11. A. Add power/lower pitch — For constant altitude at a higher airspeed, add power and lower pitch to hold altitude.

12. D. Relieve pressures — Trim relieves control pressures so the aircraft holds the set attitude with minimal input.

13. D. Lead by 10% of VS — Leveling off, the pilot begins lowering pitch leading by roughly 10% of the vertical speed.

14. C. Slight pitch increase — In a level turn, the lost vertical lift component is compensated by a small increase in pitch (back pressure) to hold altitude.

15. C. Small smooth inputs — Over-controlling is avoided by making small, smooth inputs and allowing the aircraft to respond before adjusting further.

16. B. Nose-up decreases airspeed — At constant power, raising pitch (nose-up) decreases airspeed and tends to climb.

17. B. Pitch for airspeed — A constant-airspeed descent at idle is controlled by adjusting pitch to maintain the target airspeed, accepting the resulting descent rate.

18. D. Ball centered — Coordinated aileron and rudder keep the ball centered (coordinated flight), avoiding slip or skid.

19. C. Airspeed change/pitch adjust — A power change at constant pitch in level flight changes airspeed and requires a pitch adjustment to hold altitude.

20. A. Consistent pitch attitude — Precise altitude control depends most on establishing and holding a consistent pitch attitude on the attitude indicator.

21. C. Lower pitch slightly — If airspeed is decreasing in a constant-airspeed climb, lower the pitch slightly to regain the target airspeed.

22. B. Four fundamentals — The fundamental maneuvers are straight-and-level, climbs, descents, and turns.

23. B. Ball centered — A coordinated standard-rate turn shows the standard-rate index and the ball centered.

24. C. Cross-check + smooth inputs — Smoothness and precision come from a disciplined cross-check combined with small, smooth control/power adjustments and proper trim.

25. A. Precise flight path by instruments — The objective of attitude instrument flying is to precisely control the flight path by reference to instruments through deliberate attitude and power management.