T-6B Primary Flight Training – Contact Stage 1 Practice Test (Sample)

Study Guide

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Questions

1. **Which situation would lead to a left yaw induced by a gyroscopic effect from a clockwise turning propeller?**
   - A. Altitude increase
   - B. Nose pitched down
   - C. Nose yawed left
   - D. Nose yawed right

2. **When should you start the after landing checklist?**
   - A. As soon as you touch down
   - B. Once the aircraft has reached a safe taxiing speed
   - C. When the aircraft is clear of the duty runway
   - D. After reaching the parking area

3. **What is the typical KIAS for Slow Cruise configuration?**
   - A. 130 KIAS
   - B. 140 KIAS
   - C. 150 KIAS
   - D. 160 KIAS

4. **Is it true that you should not start the after landing checklist until the aircraft is clear of the duty runway?**
   - A. True
   - B. False
   - C. Only under certain conditions
   - D. Depends on the aircraft type

5. **How can a pilot compensate for the left yawing tendency as the aircraft leaves the runway?**
   - A. Use aileron only
   - B. Use of rudder, not aileron
   - C. Increase power immediately
   - D. Maintain a steady course with elevator trim

6. What does a stall angle of attack (AOA) indicate?

- **A. The maximum lift generation before stall**
- **B. The point at which the aircraft can spin**
- **C. The threshold for controlled flight**
- **D. Validity of control effectiveness**

7. Which two primary factors must be present for an aircraft to spin?

- **A. Stalled AOA and yaw**
- **B. Level flight and aileron input**
- **C. Excessive speed and roll**
- **D. Trimmed flight and thrust**

8. What role does stress play in the IMSAFE checklist?

- **A. It is a measure of physical fitness**
- **B. It assesses psychological readiness**
- **C. It determines flight speed**
- **D. It affects aerodynamics**

9. In what situation would you experience an uncommanded nose drop during flight?

- **A. During a steep descent**
- **B. In a power-on-stall maneuver**
- **C. During normal cruising flight**
- **D. When performing a turn**

10. How does the concept of performance relate to power and attitude in aviation?

- **A. It ignores external factors**
- **B. It is solely based on pilot experience**
- **C. It is determined by the combination of both**
- **D. It varies based on weather conditions**

Answers

1. **C**
2. **C**
3. **C**
4. **A**
5. **B**
6. **A**
7. **A**
8. **B**
9. **B**
10. **C**

Explanations

1. Which situation would lead to a left yaw induced by a gyroscopic effect from a clockwise turning propeller?

A. Altitude increase

B. Nose pitched down

C. Nose yawed left

D. Nose yawed right

In the context of aircraft dynamics, particularly when discussing the effects of a clockwise turning propeller, the gyroscopic precession effect plays a crucial role in understanding yaw behavior. When the propeller spins, it generates a gyroscopic effect that causes the aircraft to react in response to pitch and roll inputs. When the nose of the aircraft is yawed to the left, the gyroscopic precession of the clockwise spinning propeller results in a downward force being exerted at a 90-degree angle to the direction of the applied force. This causes the aircraft to experience a leftward yawing motion. Essentially, any leftward movement of the nose will trigger a corresponding left yaw due to the gyroscopic effect produced by the rotating propeller. An increase in altitude, a nose pitched down, or a nose yawed to the right would not lead to the same left yaw effect induced by the gyroscopic forces associated with the propeller. The response of the aircraft is specific to the relationship between the rotation of the propeller, the orientation of the aircraft, and the resulting aerodynamic forces. Therefore, when the nose is yawed left, it directly correlates with the induced left yaw due to the gyroscopic effect from the clockwise rotation of the propeller.

2. When should you start the after landing checklist?

A. As soon as you touch down

B. Once the aircraft has reached a safe taxiing speed

C. When the aircraft is clear of the duty runway

D. After reaching the parking area

The appropriate time to start the after landing checklist is when the aircraft is clear of the duty runway. This ensures that all necessary checks and procedures are performed in a safe and systematic manner without impeding the flow of traffic on the active runway. Initiating the checklist while still on the runway could distract from maintaining control of the aircraft and managing the taxi, especially in an environment where situational awareness is crucial. By waiting until you've exited the runway, you can focus on safely taxiing while also reviewing the checklist items with minimal risk of distraction or urgency. Starting the checklist only after reaching a safe taxiing speed, or once you are on the taxiway, might cause the pilot to overlook important items or create a rushed environment, particularly in busy or complex airport operations. Similarly, waiting until reaching the parking area also delays the checklist actions that could be handled while taxiing as part of maintaining safety and efficiency. Thus, starting the checklist when the aircraft is clear of the duty runway aligns with best practices in aviation safety.

3. What is the typical KIAS for Slow Cruise configuration?

A. 130 KIAS

B. 140 KIAS

C. 150 KIAS

D. 160 KIAS

In the context of the T-6B primary flight training, the Slow Cruise configuration is designed for safe and controlled flight at a relatively low airspeed while maximizing the aircraft's aerodynamic efficiency. Typically, this airspeed is around 150 KIAS (Knots Indicated Airspeed). Flying at 150 KIAS during Slow Cruise allows pilots to maintain good control of the aircraft while preparing for maneuvers such as turns, descents, or climbs without pushing the aircraft towards its stall speed. This speed provides a balance between performance and safety, ensuring that pilots have adequate handling characteristics and altitude management during training exercises. Lower speeds, like 130 KIAS or 140 KIAS, might not offer the necessary margin for potential maneuvers and recovery from unexpected situations, as they approach the stall region of the aircraft's performance curve. Higher speeds such as 160 KIAS could lead to unnecessarily high descent rates or increased workload, which does not align with the purpose of the Slow Cruise configuration. Hence, the specified speed of 150 KIAS is optimal for the intended training objectives in this configuration.

4. Is it true that you should not start the after landing checklist until the aircraft is clear of the duty runway?

A. True

B. False

C. Only under certain conditions

D. Depends on the aircraft type

The statement is true because the after landing checklist should be performed only after the aircraft has safely exited the duty runway. This practice enhances safety by ensuring that the pilot can focus entirely on taxiing the aircraft without the distraction of checklist items. Once the aircraft is clear of the runway, the pilot can then attend to the necessary tasks without the risks associated with navigating while still on a runway where other aircraft may be taking off or landing. This procedure helps to maintain situational awareness and ensures that all primary responsibilities related to aircraft control and safe operation remain the priority until the aircraft is in a position where it is not in immediate conflict with other operations on the runway.

5. How can a pilot compensate for the left yawing tendency as the aircraft leaves the runway?

A. Use aileron only

B. Use of rudder, not aileron

C. Increase power immediately

D. Maintain a steady course with elevator trim

To counteract the left yawing tendency that occurs as an aircraft takes off, it is crucial to apply appropriate rudder input. This left yaw is primarily caused by the asymmetric thrust produced by the propeller. The clockwise rotation of the propeller causes a lateral force that tends to rotate the aircraft to the left. Using the rudder effectively counterbalances this force. The pilot should apply right rudder to counteract the left yaw. The rudder controls the yawing motion of the aircraft and provides the necessary corrective input to maintain a straight trajectory down the runway during takeoff. While ailerons control roll and could theoretically be used to influence the aircraft's direction, they do not effectively address yaw. Increasing power is also not a solution, as it may exacerbate the yaw tendency by increasing the thrust differential. Using elevator trim primarily affects pitch attitude, which is not relevant in correcting yawing motions. Therefore, the use of rudder is essential in maintaining straight flight during takeoff to compensate for the left yawing tendency.

6. What does a stall angle of attack (AOA) indicate?

A. The maximum lift generation before stall

B. The point at which the aircraft can spin

C. The threshold for controlled flight

D. Validity of control effectiveness

A stall angle of attack (AOA) refers to the critical angle at which an aircraft wing can no longer generate sufficient lift to sustain level flight, resulting in a stall. When the angle of attack exceeds this critical value, the airflow becomes separated from the wing's upper surface, leading to a significant loss of lift. Therefore, this angle is essential for pilots to understand, as it indicates the maximum lift a wing can produce before the onset of a stall. Understanding the stall AOA is crucial for safe flight operations, allowing pilots to recognize the limits of performance and to avoid situations that could lead to a stall. Other options might discuss related concepts, but none defines the AOA as accurately as the identification of maximum lift generation before a stall occurs.

7. Which two primary factors must be present for an aircraft to spin?

A. Stalled AOA and yaw

B. Level flight and aileron input

C. Excessive speed and roll

D. Trimmed flight and thrust

A spin occurs when an aircraft is in a stalled condition and is subjected to a yawing motion, which can often be caused by one wing being more stalled than the other. For a spin to develop, the aircraft must firstly be at a stalled angle of attack (AOA); this means that the wings are no longer generating sufficient lift, typically due to exceeding the critical angle of attack. Secondly, yaw must be present; this can happen when a pilot inadvertently applies rudder or when the aircraft experiences uneven lift, leading to one wing dropping. In summary, both a stalled AOA and yaw are essential for initiating a spin. Without a stall, the aircraft would typically recover from any disturbance or rotation, and without yaw, it wouldn’t generate the necessary asymmetrical lift that leads to a spin. This dynamic is critical for pilots to understand as it highlights the importance of maintaining control inputs during critical phases of flight, such as stall recovery.

8. What role does stress play in the IMSAFE checklist?

A. It is a measure of physical fitness

B. It assesses psychological readiness

C. It determines flight speed

D. It affects aerodynamics

The IMSAFE checklist is a vital tool in aviation used to ensure that pilots are in an appropriate physical and mental state for flying. Stress specifically relates to the psychological aspects of this checklist. It plays a significant role in assessing a pilot's psychological readiness, as stress can impact cognitive functions, emotional stability, and decision-making abilities, all of which are crucial for safe flying. Understanding one's stress levels helps a pilot gauge whether they are fit to operate an aircraft safely, as excessive stress can lead to impaired performance and increased risk of error during flight operations. In contrast, the other options relate to different aspects of pilot readiness. While physical fitness is important, it is addressed by other components of the checklist. Flight speed and aerodynamics are not directly related to the psychological readiness of a pilot, which is specifically what stress influences within the IMSAFE framework.

9. In what situation would you experience an uncommanded nose drop during flight?

A. During a steep descent

B. In a power-on-stall maneuver

C. During normal cruising flight

D. When performing a turn

An uncommanded nose drop during flight typically occurs in a power-on stall maneuver. During this maneuver, the aircraft is flown at a high angle of attack with power applied. As the angle of attack increases, the wings reach a critical point where they can no longer generate sufficient lift. This leads to a stall. When the wings stall, the airflow over them is disrupted, causing the nose to drop unexpectedly. This drop is uncommanded because it occurs without any pilot control inputs to lower the nose. In contrast, a steep descent might reduce lift but does not inherently cause an uncommanded nose drop as it involves controlled descent rates. Normal cruising flight maintains straight and level flight, and a turn, while it may introduce some changes in lift and load factors, does not typically lead to an uncommanded nose drop unless it is poorly executed or coupled with excessive altitude losses. Thus, the dynamics of a power-on stall are critical to understanding why this particular situation leads to an uncommanded nose drop.

10. How does the concept of performance relate to power and attitude in aviation?

A. It ignores external factors

B. It is solely based on pilot experience

C. It is determined by the combination of both

D. It varies based on weather conditions

The concept of performance in aviation is intricately linked to the combination of power and attitude, making the correct choice a reflection of fundamental aerodynamic principles. Power refers to the engine's capability to generate thrust, while attitude describes the aircraft's orientation in relation to the horizon. In aviation, performance is not just a function of one of these elements but rather the result of how they interact with each other. For example, the correct balance of power and attitude is essential for achieving optimal climb rates, cruising speeds, and overall maneuverability. Pilots must adjust both power (throttle settings) and attitude (the angle of attack) to enhance performance during various phases of flight, such as takeoff, climb, and approach. This interaction also accounts for how the aircraft responds to control inputs, affects stability, and impacts fuel efficiency. Therefore, recognizing that performance is determined by the combination of both power and attitude reflects an understanding of the complexities of flight dynamics, making this choice the most comprehensive and accurate.