

# T-6A Aerodynamics Practice Exam (Sample)

## Study Guide



**Everything you need from our exam experts!**

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# Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

**Remember:** successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

# How to Use This Guide

**This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:**

## **1. Start with a Diagnostic Review**

**Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.**

## **2. Study in Short, Focused Sessions**

**Break your study time into manageable blocks (e.g. 30 - 45 minutes). Review a handful of questions, reflect on the explanations.**

## **3. Learn from the Explanations**

**After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.**

## **4. Track Your Progress**

**Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.**

## **5. Simulate the Real Exam**

**Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.**

## **6. Repeat and Review**

**Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.**

**There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!**

## Questions

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- 1. What impact does a greater angle of attack have on drag?**
  - A. It reduces profile drag**
  - B. It has no significant impact on drag**
  - C. It generally increases induced drag as well as profile drag**
  - D. It only increases induced drag**
  
- 2. What happens to stall speed when lowering flaps?**
  - A. Increase**
  - B. Decrease**
  - C. No effect**
  - D. Only affected by weight**
  
- 3. What impact does increased lift have on drag?**
  - A. It increases drag**
  - B. It decreases drag**
  - C. It has no impact on drag**
  - D. It varies depending on wing shape**
  
- 4. What role does the pilot play in managing aerodynamics during flight?**
  - A. The pilot alters engine power settings only**
  - B. The pilot maintains the aircraft's speed exclusively**
  - C. The pilot manipulates control surfaces to adjust the aircraft's attitude, speed, and trajectory**
  - D. The pilot primarily monitors instruments**
  
- 5. When does an aircraft begin to produce wingtip vortices?**
  - A. On landing**
  - B. On descent**
  - C. On rotation**
  - D. When in a turn**
  
- 6. What is the critical angle of attack?**
  - A. The angle where maximum lift is achieved**
  - B. The angle at which airflow begins to separate, causing a stall**
  - C. The angle of descent during a landing approach**
  - D. The angle required for optimal thrust generation**

- 7. What are the three axes of flight?**
- A. Lateral, longitudinal, vertical**
  - B. Vertical, horizontal, diagonal**
  - C. Longitudinal, horizontal, axial**
  - D. Lateral, axial, pitch**
- 8. What is true airspeed corrected for wind?**
- A. Groundspeed**
  - B. True Airspeed**
  - C. Calibrated Airspeed**
  - D. Angle of Attack**
- 9. What does slipstream swirl cause when flying at low airspeeds and high power settings, and how is it corrected?**
- A. Right yaw, corrected by left rudder**
  - B. Left yaw, corrected by right rudder**
  - C. No effect, requires no correction**
  - D. Right roll, corrected by right aileron**
- 10. What is the term for a force applied at a distance from a fulcrum?**
- A. Torque**
  - B. Work**
  - C. Moment**
  - D. Impulse**

## Answers

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

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## **Explanations**

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## 1. What impact does a greater angle of attack have on drag?

- A. It reduces profile drag
- B. It has no significant impact on drag
- C. It generally increases induced drag as well as profile drag**
- D. It only increases induced drag

When examining the effects of a greater angle of attack on drag, it's important to understand the relationship between angle of attack and the types of drag present in an aircraft's performance. As the angle of attack increases, the lift generated by the wing also increases to a certain point. However, beyond this point, drag begins to rise significantly. This is primarily because of two types of drag: induced drag and profile drag. Induced drag is directly related to the generation of lift; as lift increases (up to the stall angle), induced drag also increases. This is due to the fact that as the angle of attack rises, airflow over the wing creates more lift, which in turn causes more airflow separation and increased vortices behind the wing, leading to a rise in induced drag. Profile drag, on the other hand, refers to the drag due to the shape of the aircraft and its components, including skin friction and form drag. As the angle of attack increases, airflow can become turbulent, and this turbulence increases the form drag. The increased lift associated with higher angles also contributes to changes in the pressure distribution over the wing, leading to further increases in drag. Therefore, a greater angle of attack does indeed result in an increase in both induced drag and profile

## 2. What happens to stall speed when lowering flaps?

- A. Increase
- B. Decrease**
- C. No effect
- D. Only affected by weight

When flaps are lowered, they change the airflow characteristics over the wings, leading to an increase in lift at lower airspeeds. This is crucial for allowing the aircraft to fly safely at slower velocities during takeoff and landing phases. The deployment of flaps alters the wing's camber and increases the overall surface area exposed to the airstream, which enhances lift generation even though the aircraft is moving slower. As a result of this increased lift, the stall speed, which is the minimum speed at which the aircraft can maintain level flight without stalling, actually decreases. By enabling the aircraft to achieve sufficient lift at a lower airspeed, flaps effectively provide the pilot with a margin of safety during slower flight regimes. Thus, lowering flaps is a critical technique to ensure that stall speed is lowered, promoting safer operations during critical phases of flight.

### 3. What impact does increased lift have on drag?

- A. It increases drag**
- B. It decreases drag**
- C. It has no impact on drag**
- D. It varies depending on wing shape**

Increased lift typically results in an increase in drag due to several aerodynamic principles. When an aircraft generates more lift, particularly at the same angle of attack, it often leads to an increase in induced drag, which is a byproduct of lift generation. Induced drag is influenced by the lift coefficient; as lift increases, induced drag does as well. The interaction between lift and drag is governed by the wings' shape and the flow of air around them. As the aircraft demands more lift—such as during takeoff, climbing, or maneuvering—it causes the air to be disrupted more significantly, leading to greater turbulence and, consequently, higher drag. This relationship exemplifies the trade-offs present in aerodynamic design, where maximizing lift can come at the cost of increased drag, affecting the overall efficiency of flight. In contrast, decreases in lift would tend to reduce drag, while having no effect on drag means that the forces remain constant regardless of lift changes. Variations based on wing shape could certainly alter the amount of lift and drag experienced, but the fundamental relationship between increased lift and drag remains constant under typical flight conditions. Hence, an increase in lift directly correlates to an increase in drag, making the first answer the most accurate.

### 4. What role does the pilot play in managing aerodynamics during flight?

- A. The pilot alters engine power settings only**
- B. The pilot maintains the aircraft's speed exclusively**
- C. The pilot manipulates control surfaces to adjust the aircraft's attitude, speed, and trajectory**
- D. The pilot primarily monitors instruments**

The pilot plays a crucial role in managing aerodynamics during flight by manipulating control surfaces to adjust the aircraft's attitude, speed, and trajectory. This process involves using the primary flight controls—ailerons, elevators, and rudder—each of which affects the aircraft's orientation and motion in three-dimensional space. For instance, the elevators control pitch, allowing the pilot to ascend or descend; ailerons control roll, enabling turns; and the rudder aids in yaw, stabilizing the aircraft's direction. By actively managing these controls, the pilot can respond to aerodynamic forces acting on the aircraft, such as lift, drag, and weight, ensuring safe and efficient flight. Additionally, maintaining proper aircraft attitude and speed is essential for optimal performance and maneuverability, particularly during various phases of flight like takeoff, climb, cruising, descent, and landing. In essence, the pilot's active engagement with the control surfaces is vital for maneuvering the aircraft in accordance with the principles of aerodynamics and for responding effectively to environmental conditions and flight dynamics.

**5. When does an aircraft begin to produce wingtip vortices?**

- A. On landing**
- B. On descent**
- C. On rotation**
- D. When in a turn**

An aircraft begins to produce wingtip vortices during the phase known as rotation, which occurs when the aircraft's main wheels leave the ground during takeoff. This is when the wings generate lift and a pressure difference forms between the upper and lower surfaces of the wings. As the airflow over the wings creates lift, the higher pressure air from beneath the wings moves around the wingtips to the lower pressure above, resulting in swirling patterns of air known as vortices. These wingtip vortices are particularly strong and can contribute significantly to wake turbulence, which poses risks to following aircraft, especially smaller ones. In the context of the other scenarios, only during rotation does the necessary lift generation occur to produce these vortices, while the other phases, such as landing and descent, either involve different aerodynamic conditions or reduced lift being generated. Thus, recognizing the key moment of rotation helps understand the onset of vortex generation during flight.

**6. What is the critical angle of attack?**

- A. The angle where maximum lift is achieved**
- B. The angle at which airflow begins to separate, causing a stall**
- C. The angle of descent during a landing approach**
- D. The angle required for optimal thrust generation**

The critical angle of attack is defined as the angle at which airflow begins to separate from the wing's upper surface, leading to a significant loss of lift and the onset of a stall. At this angle, the wing can no longer maintain smooth airflow, which results in a dramatic decrease in aerodynamic efficiency. This point is crucial in aviation, as flying beyond this angle can result in the aircraft becoming unstalled and uncontrollable. In contrast, maximum lift is achieved at a different angle, known as the angle of maximum lift coefficient, which occurs before reaching the critical angle. The angle of descent during a landing approach is unrelated to the critical angle of attack, as it pertains more to the flight path rather than the aerodynamic characteristics of the wing. Finally, thrust generation relates to the power produced by the aircraft's engines, and while it is important for overall performance, it does not pertain to the concept of angle of attack in the context of stall and lift.

## 7. What are the three axes of flight?

- A. Lateral, longitudinal, vertical**
- B. Vertical, horizontal, diagonal**
- C. Longitudinal, horizontal, axial**
- D. Lateral, axial, pitch**

In the study of flight dynamics, understanding the three axes of a flight is essential as they each represent a different plane of movement for an aircraft. The correct identification of these axes allows pilots and engineers to analyze and predict the behavior of an aircraft during various maneuvers. The lateral axis runs from wingtip to wingtip and is associated with pitch movements, allowing an aircraft to tilt forward or backward. In contrast, the longitudinal axis extends from the nose to the tail and is linked to roll movements, enabling the aircraft to rotate around its length. Lastly, the vertical axis, which runs vertically through the center of the aircraft, governs yaw movements, allowing the aircraft to turn side to side. Recognizing these three axes—lateral, longitudinal, and vertical—provides a foundation for understanding how aircraft control surfaces like ailerons, elevators, and rudders operate to facilitate the respective movements. Each surface interacts with the aircraft's axis to achieve stable flight and control during maneuvers.

## 8. What is true airspeed corrected for wind?

- A. Groundspeed**
- B. True Airspeed**
- C. Calibrated Airspeed**
- D. Angle of Attack**

True airspeed corrected for wind refers to the speed of an aircraft relative to the ground, which is known as groundspeed. When considering wind effects, true airspeed (the speed of the aircraft through the air) can be adjusted by the headwind or tailwind to determine how fast the aircraft is moving over the ground. This adjustment is crucial for navigation and flight planning, as it accounts for how wind can affect an aircraft's actual trajectory and speed. Groundspeed directly reflects the actual distance an aircraft travels over the earth's surface, making it an essential metric for pilots during flight operations. Understanding the relationship between true airspeed, groundspeed, and wind is vital for pilots to accurately determine their flight path and fuel consumption, among other operational variables. The other options do not represent true airspeed adjusted for wind. While true airspeed indicates how fast the aircraft is moving through the air regardless of wind influence, calibrated airspeed corrects for instruments and position errors but not wind. Angle of attack is related to the aircraft's lift characteristics and stall behavior, not a measure of speed in relation to wind.

**9. What does slipstream swirl cause when flying at low airspeeds and high power settings, and how is it corrected?**

- A. Right yaw, corrected by left rudder**
- B. Left yaw, corrected by right rudder**
- C. No effect, requires no correction**
- D. Right roll, corrected by right aileron**

Slipstream swirl is a phenomenon that occurs primarily at low airspeeds and high power settings, where the spinning motion of the propeller generates a corkscrew effect of airflow that affects the aircraft. This swirling air creates a differential in lift and drag on the wings, particularly because of the direction of rotation of the propeller. When the T-6A is operating under these conditions, the slipstream typically results in a tendency for the aircraft to yaw to the left. The left yaw is primarily caused by the downward-moving airflow on the left side of the aircraft, which affects the left wing more than the right. To counteract this left yawing motion, pilots apply right rudder pressure. The right rudder counteracts the yaw by helping to keep the aircraft aligned with the desired flight path. Therefore, understanding this aerodynamic effect enables a pilot to make the appropriate control inputs necessary to maintain stability and control in flight, particularly in critical phases such as takeoff and low-speed maneuvers.

**10. What is the term for a force applied at a distance from a fulcrum?**

- A. Torque**
- B. Work**
- C. Moment**
- D. Impulse**

The term for a force applied at a distance from a fulcrum is commonly referred to as a moment. In the context of physics and mechanics, a moment describes the rotational effect produced by a force applied to a lever arm. The moment is calculated as the product of the force and the distance from the fulcrum (or pivot point) to the line of action of the force. In practical terms, when you apply a force to the end of a wrench, that force creates a moment around the pivot point where the wrench is held, allowing you to turn a bolt or nut. This concept is crucial for understanding how forces lead to rotation in objects, making it foundational in both aerodynamics and engineering applications. While the term torque is commonly related to this concept and often used interchangeably, especially in the context of rotational dynamics, the term moment is more general and is specifically about the rotational effect produced by a force. This distinction helps clarify the use of the terms in different scenarios.

## Next Steps

**Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.**

**As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.**

**If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at [hello@examzify.com](mailto:hello@examzify.com).**

**Or visit your dedicated course page for more study tools and resources:**

**<https://t6aaerodynamics.examzify.com>**

**We wish you the very best on your exam journey. You've got this!**

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