Airplanes and Aerodynamics Commercial Pilot Practice Test (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

1. **In a rapid recovery from a dive, the effects of load factor would cause the stall speed to increase.**

   A. Increase

   B. Decrease

   C. No change

   D. Varies with bank angle

2. **Turbulence increases stall speed, requiring the airplane to slow below V_A.**

   A. True

   B. False

   C. Not enough information

   D. Only at high altitude

3. **What changes in airplane longitudinal control must be made to maintain altitude while the airspeed is being decreased? Increase the angle of attack to compensate for the decreasing lift.**

   A. Decrease the angle of attack.

   B. Increase the angle of attack to compensate for the decreasing lift.

   C. Increase throttle and maintain angle of attack.

   D. Use more bank angle instead of changing AoA.

4. **During a level turn, if airspeed increases, what action is necessary to maintain altitude?**

   A. Increase bank angle

   B. Decrease angle of attack

   C. Maintain current

   D. Increase angle of attack

5. Which statement correctly describes the effect of increasing bank angle on lift components?

A. The vertical component of lift increases and the horizontal component decreases.

B. The total lift remains constant as bank angle increases.

C. The vertical component of lift decreases and the horizontal component increases.

D. Both components of lift increase with bank angle.

6. When the wing exceeds its critical angle of attack, what occurs?

A. The airfoil's pitch moment becomes zero

B. Center of gravity becomes unstable

C. The airplane accelerates uncontrollably

D. A stall occurs

7. In a glide with an angle of attack of 10 degrees, how much altitude is lost in 1 mile?

A. 240 ft

B. 480 ft

C. 960 ft

D. 120 ft

8. In a level coordinated turn with a 60° bank, the load factor is how many times the gross weight?

A. 1.0 times

B. 2.0 times

C. 1.5 times

D. 2.5 times

9. Stall speed is affected by weight, load factor, and power.

A. Weight only

B. Load factor only

C. Power only

D. Weight, load factor, and power

10. Across high-speed flight, which issue may be observed as a compressibility effect when crossing the critical Mach number?

A. Control Difficulties

B. Increased Engine Stall Margin

C. No Noticeable Effects

D. Stable Handling at All Speeds

Answers

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

Explanations

1. In a rapid recovery from a dive, the effects of load factor would cause the stall speed to increase.

A. Increase

B. Decrease

C. No change

D. Varies with bank angle

When the airplane is pulled out of a dive, the load factor rises above 1 as you maintain or regain level flight. Stall speed isn't a fixed number; it increases with how much lift the wing must produce to support the airplane's weight under that load factor. Lift is proportional to dynamic pressure and Cl, and at stall Cl is limited to Cl_max. So with a higher load factor, the wing must generate more lift, which means you must fly faster to reach Cl_max before stalling. In essence, Vs grows roughly with the square root of the load factor, so during a rapid recovery from a dive the stall speed increases.

2. Turbulence increases stall speed, requiring the airplane to slow below V_A.

A. True

B. False

C. Not enough information

D. Only at high altitude

Turbulence brings gusts that change the wing's load and the angle of attack momentarily, which can raise the speed at which the wing would stall in those conditions. Because of that, pilots aim to maintain enough airspeed to tolerate gusts—typically near the turbulence penetration speed, which is associated with the maneuvering speed range and provides margin against sudden loads. Slowing below maneuvering speed in rough air would reduce that margin and make a stall more likely when a gust arrives. So while turbulence does raise the effective stall tendency, the safe response is not to slow below V_A; you generally keep speed near or above the turbulence penetration speed.

3. What changes in airplane longitudinal control must be made to maintain altitude while the airspeed is being decreased? Increase the angle of attack to compensate for the decreasing lift.

A. Decrease the angle of attack.

B. Increase the angle of attack to compensate for the decreasing lift.

C. Increase throttle and maintain angle of attack.

D. Use more bank angle instead of changing AoA.

When flying at a lower speed, lift at the same angle of attack drops because dynamic pressure is lower. To keep the airplane at the same altitude, you must restore lift, which means increasing the angle of attack. This is done by pitching up, raising the nose to hold enough lift at the slower airspeed. As you increase AoA, be mindful of stall risk and keep it within safe limits. Decreasing the angle of attack would reduce lift further, making altitude control worse. Merely increasing throttle and keeping the same angle of attack isn't about the longitudinal input you're using to climb or slow—it's an engine control issue, not the pitch change needed to maintain altitude. Using a larger bank angle changes flight path to a turn and increases load factor, which isn't the direct method to compensate for a decrease in speed while trying to stay level.

4. During a level turn, if airspeed increases, what action is necessary to maintain altitude?

A. Increase bank angle

B. Decrease angle of attack

C. Maintain current

D. Increase angle of attack

In a level turn, lift must balance the weight. When airspeed increases, the lift tends to rise because dynamic pressure is higher for the same angle of attack. To keep the airplane at the same altitude, you need to reduce lift back to the level required for the current bank angle. The straightforward way to do that is to decrease the angle of attack, which lowers the lift coefficient and brings the total lift back to what's needed to balance weight. If you instead kept the same angle of attack or increased it, lift would stay high or rise further, causing the airplane to climb rather than stay level. Increasing bank angle would change the required lift (and the turn dynamics) but isn't the direct method to maintain altitude when speed has increased.

5. Which statement correctly describes the effect of increasing bank angle on lift components?

A. The vertical component of lift increases and the horizontal component decreases.

B. The total lift remains constant as bank angle increases.

C. The vertical component of lift decreases and the horizontal component increases.

D. Both components of lift increase with bank angle.

When you bank the airplane, the lift vector tilts away from the vertical toward the wings. You can think of lift as having two components: a vertical component that helps balance weight, and a horizontal component that provides the centripetal force to turn. If the total lift is not changed, the vertical component is L cos(bank angle) and the horizontal component is L sin(bank angle). As the bank angle increases, cos(bank angle) decreases and sin(bank angle) increases, so the vertical component decreases while the horizontal component increases. The horizontal portion pulls the aircraft into the turn, while the vertical portion diminishes—unless you increase total lift to keep the vertical component equal to weight, which is typically done in practice to maintain altitude.

6. When the wing exceeds its critical angle of attack, what occurs?

A. The airfoil's pitch moment becomes zero

B. Center of gravity becomes unstable

C. The airplane accelerates uncontrollably

D. A stall occurs

Pushing past the critical angle of attack causes the wing to lose its ability to generate lift because the airflow can no longer follow the wing's surface. This flow separation creates a turbulent wake, so lift drops off dramatically while drag rises. The airplane will tend to descend unless you lower the nose to reduce the angle of attack and, if needed, add power to regain airspeed and reattach the flow. Other options aren't describing what happens: the pitching moment isn't inherently zero at stall, and the center of gravity doesn't become unstable simply from exceeding the critical angle of attack. The stall isn't a situation where the airplane accelerates uncontrollably; typically, lift is lost and speed management becomes critical. The correct outcome is that a stall occurs.

7. In a glide with an angle of attack of 10 degrees, how much altitude is lost in 1 mile?

A. 240 ft

B. 480 ft

C. 960 ft

D. 120 ft

In a glide, how much altitude you lose over a given horizontal distance depends on the glide angle—the path's slope below the horizon. The vertical drop equals the horizontal distance times the tangent of the glide angle. The angle of attack tells you about lift and drag, but it isn't the same as the glide angle; a steady glide typically sits at a small glide angle, often around 5 degrees for many light aircraft. If the glide angle is about 5 degrees, tan(5°) ≈ 0.0875. For 1 mile (5280 ft) of horizontal distance, the altitude lost is 5280 × 0.0875 ≈ 462 ft, which is in the neighborhood of 480 ft. So the expected loss is around 480 ft per mile. The 10-degree angle of attack describes lift characteristics, not the actual descent angle in a steady glide, which is why the 480 ft figure is the reasonable estimate.

8. In a level coordinated turn with a 60° bank, the load factor is how many times the gross weight?

A. 1.0 times

B. 2.0 times

C. 1.5 times

D. 2.5 times

In a level coordinated turn, lift must both balance the weight and provide the inward force for turning. The vertical balance gives L cos φ = W, where φ is the bank angle. So the load factor n, which is L/W, equals 1/cos φ. For a 60-degree bank, cos 60° is 0.5, so n = 1/0.5 = 2.0. That means the airplane loads about twice its gross weight in a level 60-degree turn. At shallower banks the load factor is smaller, and it increases with steeper banks.

9. Stall speed is affected by weight, load factor, and power.

A. Weight only

B. Load factor only

C. Power only

D. Weight, load factor, and power

Stall speed is the minimum airspeed at which the wing can produce enough lift to balance the aircraft's weight in the current configuration. When the aircraft is heavier, it needs more lift to stay level, so it must fly faster to avoid stalling. In a turn or any maneuver with a bank, the load factor increases, meaning the wings must generate more lift than the weight alone. That additional lift pushes stall speed higher because you reach the lift limit sooner as you slow down. Power enters the picture through the propeller's slipstream. As power increases, the air pushed by the propeller flows faster over the wing, boosting lift at a given angle of attack. With that extra lift from the propwash, you can fly a bit slower before you reach the stall, so stall speed is affected by power as well. Put together, weight, load factor, and power all influence the speed at which stall occurs.

10. Across high-speed flight, which issue may be observed as a compressibility effect when crossing the critical Mach number?

A. Control Difficulties

B. Increased Engine Stall Margin

C. No Noticeable Effects

D. Stable Handling at All Speeds

As we approach and cross the critical Mach number, compressibility effects become noticeable because parts of the airflow around the airplane reach or exceed Mach 1 while other parts remain subsonic. The result is shock waves forming on surfaces like the wing, which abruptly change the pressure distribution and shift the center of pressure. These changes reduce the effectiveness of control surfaces and can produce buffeting, making it harder to achieve precise control and sometimes causing quicker or more abrupt pitching or rolling responses. That's why control difficulties are the most likely issue observed when compressibility effects appear at transonic speeds. The other options don't fit the physics: engine stall margins aren't inherently improved by speed at this regime, there are noticeable effects rather than none, and handling isn't guaranteed to remain stable across speeds when compressibility comes into play.

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.

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

https://airplanesaerocommpilot.examzify.com

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