

Airplanes and Aerodynamics Commercial Pilot Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

Table of Contents

Copyright 1

Table of Contents 2

Introduction 3

How to Use This Guide 4

Questions 5

Answers 8

Explanations 10

Next Steps 15

SAMPLE

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

SAMPLE

- 1. At high speeds near or beyond the critical Mach, which event can occur as a compressibility effect, with the correct choice being the second option?**
 - A. Increased Fuel Consumption**
 - B. Drag Increases**
 - C. Enhanced Stability**
 - D. Zero Effect on Airflow**

- 2. In small airplanes, spin recovery may be difficult if the CG is rearward; rotation is around the CG.**
 - A. Spin recovery is easier when the CG is rearward.**
 - B. Spin recovery is unaffected by CG position.**
 - C. In small airplanes, spin recovery may be difficult if the CG is rearward; rotation is around the CG.**
 - D. Spin recovery is easiest when CG is forward.**

- 3. The speed that yields the maximum lift-to-drag ratio in steady flight is associated with which performance?**
 - A. Best rate of climb**
 - B. Maximum maneuverability**
 - C. Minimum sink rate**
 - D. Best glide speed**

- 4. The ratio of an airplane's true airspeed to the speed of sound in the same atmospheric conditions is called what?**
 - A. Mach number**
 - B. Indicated airspeed ratio**
 - C. Sound-speed ratio**
 - D. True airspeed ratio**

- 5. If airspeed decreases in level flight below the speed for maximum lift/drag ratio, what happens to total drag?**
 - A. Decreases**
 - B. Increases due to induced drag**
 - C. Decreases due to parasite**
 - D. Stays the same**

- 6. In a coordinated constant-altitude turn, for a given bank angle, the load factor is:**
- A. constant**
 - B. increases with airspeed**
 - C. decreases with altitude**
 - D. varies with bank**
- 7. To maintain constant airspeed in steady, level flight, thrust must balance which aerodynamic force?**
- A. Drag**
 - B. Weight**
 - C. Lift**
 - D. Inertia**
- 8. Which is true regarding the forces acting on an aircraft in a steady-state descent? The sum of all forward forces is equal to the sum of all rearward forces.**
- A. The forward forces exceed the rearward forces.**
 - B. The rearward forces exceed the forward forces.**
 - C. The net force is directed downward only.**
 - D. The sum of all forward forces is equal to the sum of all rearward forces.**
- 9. 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**
- 10. Some aircraft are fitted with wing spoilers to decrease lift.**
- A. Increase lift**
 - B. Decrease lift**
 - C. Increase drag**
 - D. Change wing camber**

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. At high speeds near or beyond the critical Mach, which event can occur as a compressibility effect, with the correct choice being the second option?

A. Increased Fuel Consumption

B. Drag Increases

C. Enhanced Stability

D. Zero Effect on Airflow

When speeds approach the critical Mach, air starts behaving as a compressible medium rather than a simple incompressible flow. Local flow around surfaces can reach Mach 1, producing shock waves. These shocks cause a sudden rise in pressure on the surfaces and create wave drag, so the overall drag increases sharply in the transonic range. This compressibility effect is the primary reason drag goes up as you near or exceed the critical Mach. The other choices don't describe what directly happens: while higher drag can lead to more fuel burn, the fundamental event at this speed regime is the drag rise from shock waves; enhanced stability isn't guaranteed and is not the marked compressibility effect, and zero effect on airflow contradicts the basic physics of shock formation.

2. In small airplanes, spin recovery may be difficult if the CG is rearward; rotation is around the CG.

A. Spin recovery is easier when the CG is rearward.

B. Spin recovery is unaffected by CG position.

C. In small airplanes, spin recovery may be difficult if the CG is rearward; rotation is around the CG.

D. Spin recovery is easiest when CG is forward.

Spin recovery in small airplanes hinges on where the center of gravity sits because the spin rotates about the CG. A forward CG makes the aircraft more pitch-stable and gives the tail more leverage to push the nose down when you apply forward control and opposite rudder. That nose-down action reduces the angle of attack and helps break the stall, allowing the wings to regain lift and the airplane to exit the spin more readily. A rearward CG reduces stability and tail effectiveness, so the airplane tends to rotate longer and requires greater control input to counter the spin. Since the motion is about the CG, moving it forward makes recovery easier, while moving it rearward makes recovery more difficult.

3. The speed that yields the maximum lift-to-drag ratio in steady flight is associated with which performance?
- A. Best rate of climb
 - B. Maximum maneuverability
 - C. Minimum sink rate
 - D. Best glide speed**

The speed that yields the maximum lift-to-drag ratio is the one that gives the best glide performance. At this speed, the airplane achieves the most favorable balance of lift to drag in steady flight, so for a given altitude you can travel the farthest horizontally before you must descend further. Since lift equals weight in steady flight, maximizing L/D effectively minimizes drag at that lift, producing the smallest descent angle and thus the greatest glide distance. Induced drag is higher at slower speeds, while parasite drag grows with speed. Their combination creates a peak in L/D at an intermediate speed, which is why you get the maximum glide range there. Other options describe different objectives—best rate of climb is about excess power to gain altitude, minimum sink rate is about staying aloft the longest in a descent, and maneuverability relates to turning performance—not to glide distance.

4. The ratio of an airplane's true airspeed to the speed of sound in the same atmospheric conditions is called what?
- A. Mach number
 - B. Indicated airspeed ratio
 - C. Sound-speed ratio**
 - D. True airspeed ratio

Mach number is the ratio of an airplane's true airspeed to the local speed of sound. This is a dimensionless quantity because it compares how fast the aircraft is moving through the air to how fast sound travels in that same air, which depends on temperature. Since the speed of sound increases with temperature, Mach numbers change with altitude and atmospheric conditions even if your TAS stays the same. When TAS equals the local sound speed, you're at Mach 1 (the sonic speed); higher Mach numbers bring compressibility effects into play, defining subsonic, transonic, and supersonic flight. The term that expresses this TAS-to-sound-speed ratio is Mach number; the other options aren't standard terms for this ratio.

5. If airspeed decreases in level flight below the speed for maximum lift/drag ratio, what happens to total drag?
- A. Decreases
 - B. Increases due to induced drag**
 - C. Decreases due to parasite
 - D. Stays the same

In level flight with a given weight, the wing must generate lift equal to that weight. As you slow down, you must increase the lift coefficient by raising the angle of attack. That higher lift coefficient increases the wingtip vortex strength, which raises induced drag. Parasite drag, which is tied to speed, drops as you slow, but it doesn't drop fast enough to offset the surge in induced drag below the speed for best lift-to-drag ratio. So the total drag increases when you fly slower than the speed for maximum L/D.

6. In a coordinated constant-altitude turn, for a given bank angle, the load factor is:

- A. constant**
- B. increases with airspeed**
- C. decreases with altitude**
- D. varies with bank**

In a coordinated constant-altitude turn, the lift must do two jobs: support the aircraft's weight and provide the horizontal force to turn. The load factor n is the ratio of lift to weight ($n = L/W$). For a level turn, the vertical component of lift must balance weight, so $L \cos(\phi) = W$. Therefore $L = W / \cos(\phi)$, and $n = L/W = 1/\cos(\phi) = \sec(\phi)$. With the bank angle fixed, $\cos(\phi)$ is fixed, so the load factor is fixed as well. It doesn't depend on airspeed or altitude in this ideal model, only on the bank angle.

7. To maintain constant airspeed in steady, level flight, thrust must balance which aerodynamic force?

- A. Drag**
- B. Weight**
- C. Lift**
- D. Inertia**

In steady, level flight with constant speed, the airplane experiences zero net force along the direction of motion. The engine's thrust pushes forward, while air resistance creates drag backward. For the speed to stay constant, these two forces must balance each other, so thrust equals drag. Lift and weight balance each other to keep the airplane at the same altitude, but that vertical balance is separate from maintaining constant airspeed. Inertia isn't a separate force to balance; it's the tendency of the aircraft to resist changes in motion. So the thrust must balance the drag.

8. Which is true regarding the forces acting on an aircraft in a steady-state descent? The sum of all forward forces is equal to the sum of all rearward forces.

- A. The forward forces exceed the rearward forces.**
- B. The rearward forces exceed the forward forces.**
- C. The net force is directed downward only.**
- D. The sum of all forward forces is equal to the sum of all rearward forces.**

In steady-state descent, the aircraft passes through the air with constant speed and a constant flight-path angle, so there's no acceleration. To understand this, separate the forces into components parallel and perpendicular to the flight path. Along the flight path, the forward force is thrust and the rearward force is drag. Since there's no acceleration along that path in steady flight, these forces must balance, making their sums equal. The forces perpendicular to the flight path—lift and weight—also balance so the aircraft maintains its angle of descent. If forward forces exceeded rearward ones, the aircraft would accelerate forward; if rearward exceeded forward, it would slow or descend differently. The statement that the sums are equal reflects the zero-acceleration condition along the direction of motion in steady descent.

9. 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 $L \cos \phi = W$, where ϕ is the bank angle. So the load factor n , which is L/W , equals $1/\cos \phi$. For a 60-degree bank, $\cos 60^\circ$ 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.

10. Some aircraft are fitted with wing spoilers to decrease lift.

- A. Increase lift
- B. Decrease lift**
- C. Increase drag
- D. Change wing camber

Spoilers reduce lift by intentionally disturbing the airflow over the wing. When deployed, they trip the smooth upper-surface flow into turbulence, causing the wing to shed lift and operate at a lower lift coefficient for the same airspeed. This helps the airplane descend or slow down without increasing speed, and the disruption also increases drag as the flow becomes more turbulent. They don't increase lift, and they don't change the wing's camber—the wing shape is fixed, while spoilers alter the flow characteristics to reduce lift.

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!

SAMPLE