

Theory of Rotary Wing Flight 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

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- 1. Which factor is listed as causing loss or apparent loss of ground effect?**
 - A. Beginning of translational movement**
 - B. Altitude greater than two rotor diameters**
 - C. Hovering into a wind**
 - D. Tall grass and bushes**

- 2. In hover, the power required to hover is typically less than out of ground effect.**
 - A. In ground effect, the power required to hover is typically less than out of ground effect**
 - B. In ground effect, the power required to hover is typically greater than out of ground effect**
 - C. In ground effect, the power required to hover is the same as out of ground effect**
 - D. Ground effect has no impact on hover power**

- 3. Counter-torque is achieved by which means?**
 - A. Anti-Torque/Tail Rotor Thrust**
 - B. Increased Main Rotor Power**
 - C. Elevating The Helicopter**
 - D. Rudder Deflection**

- 4. Which term describes the lower shape of an airfoil?**
 - A. Leading edge**
 - B. Camber line**
 - C. Lower camber**
 - D. Trailing edge**

- 5. Which of the following is a disadvantage of a symmetrical airfoil?**
 - A. Less lift at a given angle of attack**
 - B. Constant center of pressure**
 - C. Ease of construction**
 - D. Lower cost**

- 6. What control input is required to recover from dynamic rollover on level ground?**
- A. Perform a smooth moderate collective reduction**
 - B. Push opposite cyclic aggressively**
 - C. Increase throttle to restore rotor RPM**
 - D. Apply full pedal input**
- 7. What type of drag is associated with rotor-tip vortices?**
- A. Parasite**
 - B. Form**
 - C. Induced**
 - D. Profile**
- 8. What types of single rotor helicopters are susceptible to UY?**
- A. All**
 - B. Two-blade rotor designs**
 - C. Three-blade rotor designs**
 - D. Rigid rotor designs**
- 9. At what airspeeds are single rotor helicopters most susceptible to UY?**
- A. Airspeeds less than 30 knots**
 - B. Airspeeds greater than 60 knots**
 - C. Airspeeds between 30 and 60 knots**
 - D. All airspeeds equally**
- 10. Which statement best defines an airfoil's purpose?**
- A. A wing tip**
 - B. A flat plate moving through air**
 - C. A surfaced body designed to produce a lift or thrust force when subjected to airflow**
 - D. The center of gravity**

Answers

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

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Explanations

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1. Which factor is listed as causing loss or apparent loss of ground effect?

- A. Beginning of translational movement**
- B. Altitude greater than two rotor diameters**
- C. Hovering into a wind**
- D. Tall grass and bushes**

Ground effect is the cushion the rotor produces when its downwash is close to the surface, with the ground reflecting some of that flow back up and increasing lift efficiency. When you begin translating from a hover, the rotor wash starts moving forward and the ground's reflection no longer interacts with the rotor inflow in the same way. The downwash becomes less confined, the induced velocity at the rotor increases, and more power is needed to maintain the same altitude—so you experience an apparent loss of ground effect. This transition is the moment most pilots notice the effect, which is why beginning translational movement is listed as causing loss or apparent loss of ground effect. Being higher than about a rotor diameter removes ground effect regardless of motion, hover wind simply shifts the inflow a bit, and tall grass or bushes don't change the fundamental near-ground flow in the same way.

2. In hover, the power required to hover is typically less than out of ground effect.

- A. In ground effect, the power required to hover is typically less than out of ground effect**
- B. In ground effect, the power required to hover is typically greater than out of ground effect**
- C. In ground effect, the power required to hover is the same as out of ground effect**
- D. Ground effect has no impact on hover power**

Ground effect changes the rotor wake in a way that makes hovering more efficient near the surface. In hover, most of the power goes into producing the downward induced velocity to balance weight. When the rotor is close to the ground, the upflow is restrained and the flows from the rotor interact with the ground (like an image rotor), increasing lift efficiency. This reduces the induced velocity needed for the same thrust, so the induced power drops. As you move away from the surface, that interference fades and hover power rises toward the free-space value. So hovering near the ground typically requires less power than hovering out of ground effect.

3. Counter-torque is achieved by which means?

- A. Anti-Torque/Tail Rotor Thrust**
- B. Increased Main Rotor Power**
- C. Elevating The Helicopter**
- D. Rudder Deflection**

Counter-torque comes from the tail rotor producing a thrust that creates an opposite yawing moment to balance the engine's torque on the main rotor. When the engine turns the main rotor, the fuselage would tend to spin in the opposite direction. The tail rotor pushes air to the side at the tail, generating a horizontal force that twists the helicopter the other way, canceling that reaction. You adjust how much anti-torque is needed with the pedals, which change the tail rotor thrust. Increasing main rotor power would increase the torque you have to counter, making the problem worse; elevating the helicopter or using rudder alone doesn't provide the required counter-torque in hover or low-speed flight. So, tail rotor thrust is the mechanism that achieves counter-torque.

4. Which term describes the lower shape of an airfoil?

- A. Leading edge**
- B. Camber line**
- C. Lower camber**
- D. Trailing edge**

In airfoil geometry, the bottom boundary is the lower surface, not a special term like "lower camber." Camber is the amount and direction of curvature of the airfoil, and it's described by the camber line—the mean curve from the leading edge to the trailing edge that lies halfway between the upper and lower surfaces. The camber line defines how the airfoil's thickness is distributed relative to the chord, but it isn't the shape of the bottom surface itself. So, describing the lower boundary as "lower camber" isn't standard terminology. If you're talking about the bottom shape, you'd call it the lower surface; if you're talking about the line that represents the mean curvature, you'd use the camber line. The other terms—leading edge and trailing edge—refer to the front and rear points of the chord, not the bottom boundary.

5. Which of the following is a disadvantage of a symmetrical airfoil?

- A. Less lift at a given angle of attack**
- B. Constant center of pressure**
- C. Ease of construction**
- D. Lower cost**

The main idea is that lift is strongly affected by camber. A symmetrical airfoil has no camber—its curvature is the same on both surfaces—so at any given angle of attack it generates less lift than a cambered airfoil. Camber adds curvature that helps air flow accelerate over the top surface, creating a higher lift coefficient for the same angle. Because of this, you'd need a larger angle of attack to achieve the same lift with a symmetric airfoil, which also brings the rotor closer to stall and reduces overall efficiency. The center of pressure for a symmetric airfoil is not fixed; it moves as the angle of attack changes, so saying the center of pressure is constant isn't correct. And while symmetric airfoils can be easier to manufacture and cheaper, those are manufacturing considerations rather than aerodynamic disadvantages in lift production.

6. What control input is required to recover from dynamic rollover on level ground?

- A. Perform a smooth moderate collective reduction**
- B. Push opposite cyclic aggressively**
- C. Increase throttle to restore rotor RPM**
- D. Apply full pedal input**

Dynamic rollover recovery on level ground centers on breaking the rolling motion by reducing the lift that's contributing to the tipping moment, then letting gravity help relevel the rotor disk. A smooth, moderate reduction in collective lowers rotor thrust evenly and quickly reduces the weight support on the banked side without introducing abrupt changes. This dampens the roll rate and allows the helicopter to come back toward a level attitude without overshooting or loading the rotor system further. Abruptly pushing cyclic aggressively would aggravate the rolling motion and can drive the aircraft into a deeper rollover. Forcing more power by increasing throttle doesn't address the bank and can increase rotor energy in a way that makes recovery harder. Full pedal input affects yaw, not the bank or roll rate, so it doesn't correct dynamic rollover.

7. What type of drag is associated with rotor-tip vortices?

- A. Parasite**
- B. Form**
- C. Induced**
- D. Profile**

Induced drag is the drag produced by the lift-generating flow. When a rotor produces thrust, it leaves behind swirling tip vortices in the wake. That wake creates additional downward flow and disturbs the air around the blade, meaning the rotor must do extra work to generate the same amount of lift. The energy spent in overcoming this disturbed, swirling air appears as induced drag on the rotor. This effect is most noticeable in hover or slow flight when lift is large and forward speed is low. Parasite drag comes from non-lifting parts, and profile/form drag relate to the airfoil's shape or surface—neither is tied to the lift-induced wake behind the rotor.

8. What types of single rotor helicopters are susceptible to UY?

A. All

B. Two-blade rotor designs

C. Three-blade rotor designs

D. Rigid rotor designs

In single-rotor helicopters, the main rotor's rotation creates torque that tends to spin the fuselage in the opposite direction, so an anti-torque system—the tail rotor or an equivalent arrangement—must provide thrust to keep the aircraft's yaw in check. If that anti-torque capability is lost or overwhelmed—due to tail-rotor damage, a loss of tail-rotor thrust, engine power changes that demand more anti-torque thrust, or gusty winds that shift the balance—the aircraft will yaw uncommandedly. This risk exists regardless of the rotor blade count or how rigid the rotor is designed. Two-blade, three-blade, or rigid rotor configurations all rely on anti-torque to maintain coordinated flight, and all can experience uncommanded yaw if that anti-torque control is compromised. The differences among these designs mainly affect how the yaw develops and how the aircraft responds, not whether yaw can occur at all.

9. At what airspeeds are single rotor helicopters most susceptible to UY?

A. Airspeeds less than 30 knots

B. Airspeeds greater than 60 knots

C. Airspeeds between 30 and 60 knots

D. All airspeeds equally

In a single-rotor helicopter, yaw control is provided primarily by the tail rotor, and the amount of directional stability you have depends a lot on how fast you're moving forward. When you're in hover or flying very slowly (low airspeeds), you have almost no translational flow over the fuselage and tail surfaces. That means less natural damping of yaw motions, and any upset or disturbance—changes in engine or tail rotor thrust, a gust, or a small tail rotor inefficiency—can produce a noticeable, uncommanded yaw that's harder to counteract. As you pick up speed into slow-to-moderate forward flight, the aerodynamics begin to stabilize the aircraft: the added flow over the vertical fin and the tail area provides more damping, and the tail rotor operates in a more favorable airflow, making yaw disturbances easier to manage. So the susceptibility to uncommanded yaw is greatest at very low speeds, i.e., less than 30 knots.

10. Which statement best defines an airfoil's purpose?

- A. A wing tip**
- B. A flat plate moving through air**
- C. A surfaced body designed to produce a lift or thrust force when subjected to airflow**
- D. The center of gravity**

An airfoil is shaped to convert the motion of air into an aerodynamic force. Its curved upper surface and cambered profile create a pressure difference as air flows past, so the surface produces lift; when used as a rotor blade, that same shape can also generate thrust along the flight direction. This is the fundamental purpose: to produce lift or thrust through the interaction with airflow. It's not simply a wing tip or a flat plate; and the center of gravity is unrelated to the primary function of generating aerodynamic force.

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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://theoryofrotarywingflight.examzify.com>

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

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