THEORY OF ROTARY WING FLIGHT PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. Which law is involved in the statement that more power is needed to obtain a desired RPM than is needed to maintain the RPM?

A. Torque Effect

B. Action/Reaction

C. Acceleration

D. Inertia

2. Which component acts as thrust when the rotor disk is tilted?

A. Vertical

B. Horizontal

C. Both

D. Neither

3. The two basic types of airfoils are:

A. Symmetrical

B. Nonsymmetrical (cambered)

C. Symmetrical and nonsymmetrical (cambered)

D. Elliptical

4. How do you counter torque?

A. Anti-Torque/Tail Rotor Thrust

B. Increased Main Rotor Blade Pitch

C. Downwash Augmentation

D. Lateral Cyclic Input

5. In a semi-rigid rotor system, the rotor disk tilts relative to which component?

A. Mast

B. Hub

C. Blade root

D. Center line

6. Resultant relative wind definition.

A. Rotational relative wind modified by induced flow

B. Rotational relative wind added to forward speed

C. Induced flow only

D. Free stream wind

7. Define translating tendency.

A. Tendency of a single rotor helicopter to drift right while hovering

B. Tendency of a helicopter to drift left when landing

C. Tendency of rotor blades to stall

D. Tendency of tail rotor to yaw

8. To prevent uncommanded yaw, what type of wind should we avoid below 30 knots airspeed?

A. Tailwind

B. Headwind

C. Crosswind

D. Variable

9. Which control input counteracts nose-up pitch caused by flap blowback?

A. Additional forward cyclic

B. Increase throttle

C. Aft cyclic

D. Left pedal

10. With an increase in power, the nose of the helicopter will turn in what direction?

A. Right

B. Up

C. Straight Ahead

D. Left

Answers

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

Explanations

1. Which law is involved in the statement that more power is needed to obtain a desired RPM than is needed to maintain the RPM?

A. Torque Effect

B. Action/Reaction

C. Acceleration

D. Inertia

Rotational inertia is what explains why you need more power to raise the rotor speed than to hold it steady. A rotor resists changes in its angular velocity just like a spinning object resists slowing down or speeding up. To increase RPM, you must overcome that inertia and deliver energy to the rotating mass, doing work equal to the increase in rotational kinetic energy. Since kinetic energy grows with the square of angular speed, the required energy (and thus power, especially while you're accelerating) is larger as you push toward a higher RPM. Once you've reached the target speed, you only need to supply enough power to balance ongoing losses (bearings, drag, airframe drag, etc.), which is much smaller than the peak power needed during acceleration. So the driver of the higher power requirement during speeding up is the rotor's inertia.

2. Which component acts as thrust when the rotor disk is tilted?

A. Vertical

B. Horizontal

C. Both

D. Neither

When the rotor disk is tilted, the thrust vector tilts as well. Thrust is the force along the rotor axis, so tilting the disk creates a vertical component that helps lift and a horizontal component that pushes the aircraft forward. In level forward flight, the horizontal component is what provides thrust in the forward direction, while the vertical component continues to balance weight as lift. So the horizontal part of the tilted thrust vector is the thrust, and the vertical part is lift.

3. The two basic types of airfoils are:

A. Symmetrical

B. Nonsymmetrical (cambered)

C. Symmetrical and nonsymmetrical (cambered)

D. Elliptical

Airfoils are most commonly classified by camber. There are two broad categories: symmetric, which has zero camber and identical curvature on top and bottom, and nonsymmetric or cambered, which has curvature that favors lift and is not identical on both sides. This distinction matters because cambered airfoils generate lift more readily and at smaller angles of attack, while symmetric airfoils rely more on the angle of attack to produce lift and have a neutral zero-lift angle. The option that lists both symmetric and cambered as the two basic types correctly captures this fundamental classification. The other choices point to either one type only or to a specific shape (elliptical) rather than the general categories by camber.

4. How do you counter torque?

A. Anti-Torque/Tail Rotor Thrust

B. Increased Main Rotor Blade Pitch

C. Downwash Augmentation

D. Lateral Cyclic Input

Countering rotor torque is about providing an opposite yawing moment so the fuselage doesn't spin when the engine drives the main rotor. The classic solution is an anti-torque system—the tail rotor creates lateral thrust at the tail, producing a yaw moment that balances the torque produced by the main rotor. By adjusting how much thrust the tail rotor provides, you keep the helicopter's heading in hover and control yaw throughout flight. Raising the main rotor blade pitch increases lift but also increases the torque the engine applies to the rotor; that doesn't counter torque by itself, it actually changes how much anti-torque is needed. Downwash augmentation deals with airflow effects and doesn't address torque reaction. Lateral cyclic input can influence motion and yaw only as a secondary effect, not as the primary method to counter torque.

5. In a semi-rigid rotor system, the rotor disk tilts relative to which component?

A. Mast

B. Hub

C. Blade root

D. Center line

In a semi-rigid rotor system, the hub provides a single flapping hinge, which allows the rotor disk to tilt as a unit. The mast is the fixed reference to the airframe, so the observable tilt of the rotor disk occurs relative to the mast. This arrangement lets the disk rotate its plane to balance lift differences between blades without requiring multiple hinges at the hub. The tilting is not described relative to the hub, blade root, or the aircraft's centerline, but specifically relative to the mast.

6. Resultant relative wind definition.

A. Rotational relative wind modified by induced flow

B. Rotational relative wind added to forward speed

C. Induced flow only

D. Free stream wind

The wind a rotor blade element sees is a combination of the blade's rotation and the air moving through the disk due to thrust (and forward speed). The tangential component from the blade's spin is the rotational relative wind. The air moving axially through the disk, caused by thrust (induced flow) and any forward flight, modifies that axial component. The resulting relative wind is the vector sum of the rotational component and the axial component, i.e., the rotational relative wind modified by induced flow. This captures how rotation and induced downwash together determine the wind the blade element actually encounters. So, the best description is that the resultant relative wind is rotational relative wind modified by induced flow. It's not just free stream wind, not just induced flow alone, and not simply rotational wind added to forward speed without accounting for the induced flow's effect.

7. Define translating tendency.

A. Tendency of a single rotor helicopter to drift right while hovering

B. Tendency of a helicopter to drift left when landing

C. Tendency of rotor blades to stall

D. Tendency of tail rotor to yaw

Translating tendency is the tendency of a single-rotor helicopter to drift horizontally while hovering. In a hover, the rotor system creates a slight yaw and lateral aerodynamic effects due to the interaction of rotor wash with the fuselage and tail, so without pedal input the helicopter tends to move to one side. For many conventional configurations, this results in a drift to the right, which is why pilots must apply pedal to keep the helicopter in one spot. As the helicopter gains translational airflow (moving forward), translational lift and changes in rotor/airflow interactions reduce this lateral drift, making the hover feel more stable.

8. To prevent uncommanded yaw, what type of wind should we avoid below 30 knots airspeed?

A. Tailwind

B. Headwind

C. Crosswind

D. Variable

When flying at low airspeed, yaw control relies mainly on the anti-torque system to counter the rotor's torque and on how wind interacts with the rotor flow and tail area. A wind coming from the rear (a tailwind) changes the surrounding airflow around the tail boom and rotor system in a way that makes the yaw moment more sensitive to gusts and small changes in wind. With little translational airspeed to dampen disturbances, these small changes can produce an uncommanded yaw unless the pilot quickly and decisively uses the pedals to counter it. The other wind directions tend to produce yaw effects that are more predictable or easier to counter at low speed, so tailwinds below 30 knots are the most troublesome for maintaining stable heading.

9. Which control input counteracts nose-up pitch caused by flap blowback?

A. Additional forward cyclic

B. Increase throttle

C. Aft cyclic

D. Left pedal

When flap blowback creates a nose-up tendency, the rotor disk must be tilted forward to re-establish the original attitude. Applying additional forward cyclic accomplishes this by tilting the rotor plane forward, which moves the lift vector ahead of the center of gravity and produces a nose-down moment to cancel the nose-up pitch. Throttle changes affect engine power, not the immediate pitch attitude. Aft cyclic would tilt the rotor backward and worsen the nose-up tendency, and left pedal changes yaw, not pitch. So, the correct input is additional forward cyclic.

10. With an increase in power, the nose of the helicopter will turn in what direction?

A. Right

B. Up

C. Straight Ahead

D. Left

Torque that reacts on the fuselage is the main idea. As power increases, the engine applies more torque to spin the main rotor. Newton's third law says the helicopter fuselage experiences an equal and opposite torque. The tail rotor counteracts this by pushing on the tail to keep the nose from yawing. If you don't adjust pedal input to compensate, the increased torque makes the fuselage rotate in the direction opposite to the main rotor's rotation. Here, the main rotor turns clockwise when viewed from above, so the opposite yaw is to the left. That's why the nose turns left with an increase in power.

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!