FAA AVIATION PHYSICS 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.

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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!

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Questions

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1. How does load factor affect stall speed?

A. It lowers the stall speed

B. It has no effect

C. It raises the stall speed

D. It only affects small aircraft

2. A wing with a high aspect ratio compared to a low aspect ratio wing will have what characteristic?

A. A higher stall speed

B. A lower stall speed

C. Higher drag

D. Increased lift at lower speeds

3. What determines the mechanical advantage of an arrangement of ropes and pulleys?

A. The weight of the object being lifted

B. The length of the ropes used

C. The number of ropes that support the weight

D. The material of the ropes

4. What is Johnny's acceleration if his speed increases from 5 m/s to 25 m/s over 5 seconds?

A. 1 m/s^2

B. 2 m/s^2

C. 4 m/s^2

D. 5 m/s^2

5. What is meant by the term absolute humidity?

A. The total weight of water vapor in the air

B. The maximum amount of water vapor the air can hold

C. The actual amount of water in a given volume of air

D. The percentage of water vapor in the atmosphere

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6. What happens to the effort required to lift a load as the fulcrum moves closer to the load?

A. The effort required increases

B. The effort required remains the same

C. The effort required decreases

D. The load becomes impossible to lift

7. What factor is most likely to decrease an aircraft's climb rate?

A. Increased weight

B. Lower altitude

C. Higher humidity

D. Newly serviced engines

8. What type of energy conversion occurs when work is done?

A. Chemical to kinetic

B. Potential to kinetic

C. Thermal to mechanical

D. Kinetic to potential

9. What is the primary purpose of stall strips on an airplane wing?

A. To improve aerodynamic efficiency

B. To ensure that the wing root areas stall first

C. To increase the overall lift of the wing

D. To enhance aircraft stability

10. In a double actuating cylinder system with 3000 PSI, what is the total force exerted by a piston with a surface area of three square inches on the extension side?

A. 3000 pounds

B. 6000 pounds

C. 9000 pounds

D. 12000 pounds

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Answers

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

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Explanations

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1. How does load factor affect stall speed?

A. It lowers the stall speed

B. It has no effect

C. It raises the stall speed

D. It only affects small aircraft

Load factor plays a critical role in determining stall speed. Stall speed is the minimum speed at which an aircraft can maintain controlled flight. When the load factor increases, due to maneuvers such as turns or variations in weight, the aircraft experiences more lift than at a standard load factor. The stall speed increases because stall is defined as the angle of attack at which the wings can no longer produce enough lift to support the aircraft's weight. At higher load factors, the wings need to produce significantly more lift to counteract the increased weight caused by the load factor. As a result, the aircraft must fly at a higher speed to achieve the necessary angle of attack before reaching the critical angle where stall occurs. Therefore, with an elevated load factor, stall speed increases, leading to the conclusion that it raises the stall speed. This understanding is important for pilots to ensure safe flight operations, particularly in situations that may increase the load factor, like sharp turns or heavy maneuvers.

2. A wing with a high aspect ratio compared to a low aspect ratio wing will have what characteristic?

A. A higher stall speed

B. A lower stall speed

C. Higher drag

D. Increased lift at lower speeds

A wing with a high aspect ratio has a longer span relative to its chord length. This configuration allows for a more efficient airflow over the wing surface, which contributes to a reduction in the drag experienced by the wing. When a wing has lower drag, it can maintain smooth airflow over the wing longer, enabling the aircraft to stay in a controllable flight regime at lower speeds. In this context, stall speed is defined as the minimum speed at which the wing can generate enough lift to counteract the weight of the aircraft. A wing with a high aspect ratio is typically better suited for generating lift at lower speeds due to its efficiency in utilizing the lift-to-drag ratio. Therefore, the stall speed is lower, making it advantageous for maneuvers that require low-speed performance, such as during takeoff and landing. On the other hand, wings with a low aspect ratio tend to produce more drag relative to their lift generation capabilities, resulting in a higher stall speed because they are less effective at generating lift in the critical lower speed range. Consequently, pilots flying an aircraft equipped with a high aspect ratio wing will experience a lower stall speed, which enhances safety and control during low-speed operations.

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3. What determines the mechanical advantage of an arrangement of ropes and pulleys?

A. The weight of the object being lifted

B. The length of the ropes used

C. The number of ropes that support the weight

D. The material of the ropes

The mechanical advantage of a system of ropes and pulleys is primarily determined by the number of ropes that directly support the weight being lifted. Each rope segment that supports the load decreases the amount of force needed to lift that load due to the distribution of weight across multiple segments. In essence, the more ropes that are engaged in lifting the load, the less force is required from the user to achieve the same lifting effect. This principle is rooted in the mechanical advantages provided by simple machines, like pulleys, which allow a reduction in the effort needed to lift heavy objects through increased support. While factors like the weight of the object, the length of the ropes, and the material of the ropes may influence the dynamics of the lifting process or the overall efficiency, they do not directly determine the mechanical advantage of the pulley system itself. The intrinsic property that gives the system its mechanical advantage is tied to how many ropes are sharing the load, making that choice the key indicator of mechanical advantage in this context.

4. What is Johnny's acceleration if his speed increases from 5 m/s to 25 m/s over 5 seconds?

A. 1 m/s²

B. 2 m/s²

C. 4 m/s²

D. 5 m/s²

To determine Johnny's acceleration, we can use the formula for acceleration, which is defined as the change in velocity over the time taken for that change. The formula can be expressed as: $$\text{Acceleration} (a) = \frac{\text{Final Velocity} (v_f) - \text{Initial Velocity} (v_i)}{\text{Time} (t)}$$ In this scenario, Johnny's initial speed is 5 m/s and his final speed is 25 m/s, with the time interval being 5 seconds. First, we calculate the change in velocity: $$v_f - v_i = 25 \, \text{m/s} - 5 \, \text{m/s} = 20 \, \text{m/s}$$ Next, we substitute the values into the acceleration formula: $$a = \frac{20 \, \text{m/s}}{5 \, \text{s}} = 4 \, \text{m/s}^2$$ Thus, the calculated acceleration is 4 m/s², making it clear why this value is the correct answer. This means that Johnny's speed increases by 4 meters per second for every second

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5. What is meant by the term absolute humidity?

A. The total weight of water vapor in the air

B. The maximum amount of water vapor the air can hold

C. The actual amount of water in a given volume of air

D. The percentage of water vapor in the atmosphere

Absolute humidity refers to the actual amount of water vapor present in a given volume of air, typically expressed in grams of water vapor per cubic meter of air. It provides a direct measure of the mass of water vapor, regardless of temperature or pressure conditions. This measurement is important in various fields, including meteorology and aviation, as it helps in understanding humidity's impact on air density and overall atmospheric phenomena. The other definitions describe concepts related to humidity but do not accurately define absolute humidity. For instance, total weight of water vapor in the air could refer to various volumes and is not a standardized measurement. Maximum amount of water vapor refers to the concept of saturation humidity, indicating limits rather than actual current conditions. The percentage of water vapor describes relative humidity, which compares the current amount of water vapor to the maximum possible at a specific temperature. Thus, absolute humidity distinctly focuses on the real quantity of water vapor in the air.

6. What happens to the effort required to lift a load as the fulcrum moves closer to the load?

A. The effort required increases

B. The effort required remains the same

C. The effort required decreases

D. The load becomes impossible to lift

When the fulcrum is moved closer to the load in a lever system, the mechanical advantage increases. This is due to the lever principle, which states that the effort (force) required to lift a load decreases as the distance from the fulcrum to the load becomes smaller compared to the distance from the fulcrum to the point where the effort is applied. To understand this better, consider the lever arm lengths: the effort arm (the distance from the fulcrum to where the force is applied) and the load arm (the distance from the fulcrum to the load). By moving the fulcrum closer to the load, the load arm becomes shorter while the effort arm remains relatively unchanged. According to the lever formula: $$\text{Load} \times \text{Load Arm} = \text{Effort} \times \text{Effort Arm}$$ When the load arm decreases, it requires less effort (force) to lift the same load, therefore decreasing the effort needed. This principle is fundamental in mechanics, demonstrating how levers work and providing practical applications in various tools and machines where the arrangement of the fulcrum, load, and effort can greatly influence the amount of force needed to perform

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7. What factor is most likely to decrease an aircraft's climb rate?

A. Increased weight

B. Lower altitude

C. Higher humidity

D. Newly serviced engines

Increased weight is a critical factor that directly influences an aircraft's performance, particularly its climb rate. When an aircraft is heavier, its engines must generate more thrust to achieve the necessary lift for takeoff and climbing. This increased demand for power can exceed the engines' ability to provide sufficient thrust, resulting in a slower climb rate. Additionally, a heavier aircraft requires a larger angle of attack to maintain lift at lower speeds, which can lead to a higher stall risk if not managed correctly. The relationship between weight and climb rate is governed by the basic principles of physics, where the thrust must overcome weight and drag for effective climb performance. Thus, as weight increases, the power-to-weight ratio decreases, thereby reducing the climb rate significantly. While factors like lower altitude and higher humidity can also affect performance, their impacts are generally secondary compared to the direct and significant effect of increased weight. Newly serviced engines might even enhance performance rather than diminish it.

8. What type of energy conversion occurs when work is done?

A. Chemical to kinetic

B. Potential to kinetic

C. Thermal to mechanical

D. Kinetic to potential

When work is done, potential energy is converted into kinetic energy. This occurs in various scenarios, such as when an object is lifted to a certain height (increasing its potential energy) and then allowed to fall, which converts that stored potential energy into kinetic energy as it accelerates downward due to gravity. For instance, when a rock is held at a height and then released, the potential energy that was stored while it was held is transformed into kinetic energy as the rock gains speed while falling. This principle is grounded in the laws of physics, particularly in the context of energy conservation, which states that energy cannot be created or destroyed but can only change from one form to another. In this case, the conversion from potential to kinetic energy aligns with fundamental concepts in physics, illustrating how energy transfers and transformations play a vital role in various physical phenomena.

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9. What is the primary purpose of stall strips on an airplane wing?

A. To improve aerodynamic efficiency

B. To ensure that the wing root areas stall first

C. To increase the overall lift of the wing

D. To enhance aircraft stability

Stall strips are small protrusions or modifications added to the leading edge of an airplane wing. Their primary purpose is to ensure that the airflow over the wing begins to separate and stall first at the wing root, which is the part of the wing closest to the fuselage. This design is crucial because it allows pilots to maintain aileron effectiveness, which is vital for controlled flight, especially during critical phases such as takeoff and landing. By stalling the wing root first, stall strips create a situation where the outer sections of the wing remain effective for a longer period. This helps prevent an uncontrolled roll towards one side, which could lead to a dangerous situation. The design encourages a more gradual stall and gives pilots better handling characteristics during this critical situation, allowing for more controlled recovery actions. Other options, while related to wing performance, do not accurately reflect the primary function of stall strips. For example, improving aerodynamic efficiency or enhancing lift are more general goals of wing design and do not specifically pertain to the stall characteristics influenced by stall strips. Similarly, while aircraft stability is certainly important, the specific role of stall strips is more aligned with ensuring controlled flight through proper stall progression.

10. In a double actuating cylinder system with 3000 PSI, what is the total force exerted by a piston with a surface area of three square inches on the extension side?

A. 3000 pounds

B. 6000 pounds

C. 9000 pounds

D. 12000 pounds

To determine the total force exerted by a piston in a hydraulic system, you can use the formula: $$\text{Force} = \text{Pressure} \times \text{Area}$$ In this case, the system operates at a pressure of 3000 PSI (pounds per square inch), and the surface area of the piston is three square inches. Substituting the values into the formula gives: $$\text{Force} = 3000 \, \text{PSI} \times 3 \, \text{square inches} = 9000 \, \text{pounds}$$ Thus, the total force exerted by the piston on the extension side is 9000 pounds. B is the correct answer because it correctly applies the principles of hydraulics—specifically, that force is a function of both pressure and area. This relationship illustrates how hydraulic systems can multiply force, which is essential for various mechanical applications.

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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:

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

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