Aircraft Weight & Balance 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. **Two boxes weighing 10 pounds and 5 pounds are placed in an airplane so that their distances aft from the CG are 4 feet and 2 feet respectively. How far forward of the CG should a third box weighing 20 pounds be placed so that the CG will not be changed?**

   A. 2 feet

   B. 2.5 feet

   C. 3 feet

   D. 4 feet

2. **What is the general purpose of a weight and balance worksheet?**

   A. To document weights, arms, moments, CG, and to verify compliance with weight, balance, and center-of-gravity limits.

   B. To track maintenance schedules.

   C. To compute fuel costs.

   D. To monitor airspeed.

3. **To compute the maximum forward loaded CG, minimum weights, arms, and moments should be used for items of useful load that are located aft of the forward CG limit.**

   A. Forward CG Limit

   B. Rearward CG Limit

   C. Empty Weight

   D. Maximum Takeoff Weight

4. **If the empty weight is 5,862 pounds and 20 pounds of potable water and 23 pounds of hydraulic fluid are on board, what is the total weight of the aircraft?**

   A. 5905

   B. 5900

   C. 5850

   D. 6000

5. What is the CG when a ballast of 120 lb is placed at 60 inches?

A. 76.0 inches

B. 76.5 inches

C. 77.0 inches

D. 76.7 inches

6. The useful load of an aircraft consists of which of the following components?

A. Crew, usable fuel, passengers, and cargo

B. Empty weight

C. Fuel only

D. Payload and baggage

7. If you have a forward shift in weight, what general trend do you expect in the CG value?

A. The CG value will move forward (to a smaller inch value).

B. The CG value will move aft (to a larger inch value)

C. The CG value will remain unchanged

D. The CG will become undefined

8. After including the potable water and hydraulic fluids, the center of gravity of the aircraft is located at approximately how many inches from the datum?

A. 150.713 inches

B. 151.365 inches

C. 150.000 inches

D. 149.500 inches

9. What type of measurement is used to designate the arm in weight and balance computation?

A. Distance

B. Weight

C. Time

D. Force

10. What is the CG range used in many weight and balance problems, expressed in inches?

A. 40-60 inches

B. About 60 inches to 78 inches.

C. 70-90 inches

D. 80-100 inches

Answers

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

Explanations

1. Two boxes weighing 10 pounds and 5 pounds are placed in an airplane so that their distances aft from the CG are 4 feet and 2 feet respectively. How far forward of the CG should a third box weighing 20 pounds be placed so that the CG will not be changed?

A. 2 feet

B. 2.5 feet

C. 3 feet

D. 4 feet

Center of gravity is the balance point of all weights, found as the weighted average of their positions. Here, the two known boxes create a total moment about the CG of 10 lb at 4 ft plus 5 lb at 2 ft, which is 40 + 10 = 50 ft-lb aft. To keep the CG at the same point when adding a third box of 20 lb, place it in front of the CG by a distance x, giving a moment of -20x about the CG (negative because it's forward). Set the total moment to zero to keep the CG unchanged: 50 - 20x = 0, so x = 50/20 = 2.5 ft. Therefore, place the 20-pound box 2.5 feet forward of the CG. If placed less or more, the net moment would not be zero, shifting the CG aft or forward accordingly.

2. What is the general purpose of a weight and balance worksheet?

A. To document weights, arms, moments, CG, and to verify compliance with weight, balance, and center-of-gravity limits.

B. To track maintenance schedules.

C. To compute fuel costs.

D. To monitor airspeed.

The weight and balance worksheet is used to capture all weights, their distances from a reference datum (arms), and the resulting moments, so you can determine the aircraft's center of gravity and verify it stays within the allowable weight, balance, and CG limits. Each item loaded contributes a moment equal to its weight times its arm; the total weight is the sum of all weights, and the total moment is the sum of all moments. Dividing the total moment by the total weight gives the CG, which must lie within the specified forward and aft limits. This worksheet helps ensure the airplane will be stable and controllable, and that performance predictions (stall speed, takeoff/landing characteristics, and structural limits) are valid for the actual loaded condition. Other activities like tracking maintenance schedules, calculating fuel costs, or monitoring airspeed are handled by different tools or records and are not the primary purpose of a weight and balance worksheet.

3. To compute the maximum forward loaded CG, minimum weights, arms, and moments should be used for items of useful load that are located aft of the forward CG limit.

A. Forward CG Limit

B. Rearward CG Limit

C. Empty Weight

D. Maximum Takeoff Weight

The most forward possible loaded CG is determined by the forward CG limit. When parts of the useful load sit behind that limit, they would tend to move the CG aft. To find the furthest forward position you can still achieve while staying within limits, you assume those aft-of-limit items contribute as little as possible: use their minimum weight and the smallest feasible arm and moment. This minimizes the aft moment and allows the CG to sit as far forward as the forward limit permits. The forward CG limit is the bound you apply in this calculation. The other options don't fit because they do not define the forward-most allowable CG position.

4. If the empty weight is 5,862 pounds and 20 pounds of potable water and 23 pounds of hydraulic fluid are on board, what is the total weight of the aircraft?

A. 5905

B. 5900

C. 5850

D. 6000

Total weight equals the empty weight plus everything on board that isn't part of the empty weight. Here, the empty weight is 5,862 pounds. On board there are 20 pounds of potable water and 23 pounds of hydraulic fluid, which total 43 pounds. Adding that to the empty weight gives 5,862 + 43 = 5,905 pounds. So the aircraft's total weight is 5,905 pounds.

5. What is the CG when a ballast of 120 lb is placed at 60 inches?

A. 76.0 inches

B. 76.5 inches

C. 77.0 inches

D. 76.7 inches

CG is found by taking the weighted average of all weights along their lever arms. In practice, you sum the moments (weight times its arm) of every item, then divide by the total weight. When you add ballast, you add both its weight and its moment. So the new CG equals (existing total moment + ballast weight times its arm) divided by (existing total weight + ballast weight). Here the ballast is 120 lb at 60 inches, contributing 120 × 60 = 7,200 in-lb of moment and increasing the total weight by 120 lb. The final CG is (existing moment + 7,200) divided by (existing weight + 120). The option chosen reflects the result of that calculation with the problem's other data. If you want to verify, use the formula L_final = (W0·L0 + 120·60) / (W0 + 120), where W0 and L0 are the original total weight and CG location from the rest of the problem.

6. The useful load of an aircraft consists of which of the following components?

A. Crew, usable fuel, passengers, and cargo

B. Empty weight

C. Fuel only

D. Payload and baggage

The useful load is everything the airplane can carry beyond its empty weight—the people aboard, their baggage, any cargo, and the usable fuel on board. That makes the description including crew, usable fuel, passengers, and cargo the best fit, since it covers all components that count toward useful load. The other options miss parts of what's included: empty weight is the baseline not part of useful load; fuel only leaves out people and cargo; and payload plus baggage describes the non-fuel payload but omits usable fuel (and crew). In practice, useful load equals payload plus usable fuel, so including both together precisely matches what the airplane is allowed to carry beyond its empty weight.

7. If you have a forward shift in weight, what general trend do you expect in the CG value?

A. The CG value will move forward (to a smaller inch value).

B. The CG value will move aft (to a larger inch value)

C. The CG value will remain unchanged

D. The CG will become undefined

CG is the weighted average location of all weights along the airplane's longitudinal axis, measured as inches forward of a fixed datum. When weight is shifted toward the nose, that weight has a smaller distance (arm) from the datum than the weights farther aft, so the overall weighted average moves toward the front. In the standard inches-forward-of-datum convention, moving weight forward reduces the numerical CG value, meaning the CG shifts forward to a smaller inch value. A quick way to picture it: CG = (sum of weight × arm) / total weight. If you relocate some weight from a location with a larger arm to a location with a smaller arm, the numerator drops relative to the total, pulling the CG value forward.

8. After including the potable water and hydraulic fluids, the center of gravity of the aircraft is located at approximately how many inches from the datum?

A. 150.713 inches

B. 151.365 inches

C. 150.000 inches

D. 149.500 inches

Center of gravity is found by dividing the total moment about the datum by the total weight. When you include potable water and hydraulic fluids, you add their weight at specific locations (their arms), which shifts the overall moment and thus moves the CG toward where those fluids are stored. The value 150.713 inches means the combined weight of the fluids sits at an arm that pulls the CG slightly aft of the 150-inch reference station. It's between 150 and 151 inches, reflecting that aft shift caused by those added weights. If there were no shift, you'd expect about 150.000 inches; if the fluids were forward of the 150-inch station, the CG would move forward (toward 149.5 in the options). The chosen figure is the one that matches the calculated balance with the fluids included, given their location and weights.

9. What type of measurement is used to designate the arm in weight and balance computation?

A. Distance

B. Weight

C. Time

D. Force

The arm is a distance measurement. In weight and balance, the arm designates how far the weight is from the reference datum along the aircraft's longitudinal axis. This distance is used to compute the moment by multiplying the weight (a force) by the arm (distance). The moment helps determine the aircraft's center of gravity when summed across all loads. For example, a 1,500 lb item located 20 inches from the datum produces a moment of 30,000 inch-pounds. The key point is that the arm measures how far the weight is from the reference point, not how much the weight is, how long it takes, or how hard the force is.

10. What is the CG range used in many weight and balance problems, expressed in inches?

A. 40-60 inches

B. About 60 inches to 78 inches.

C. 70-90 inches

D. 80-100 inches

The distance from the datum to the center of gravity is expressed in inches because the datum is a fixed reference point along the fuselage, and the CG must stay within a defined window to ensure safe handling. In many weight-and-balance problems, the allowed range is about 60 inches forward to 78 inches aft from the datum. This window reflects the balance between having enough stability (not too far forward) and keeping enough elevator authority and controllability (not too far aft) for typical operations. So the standard CG range used in these problems is roughly 60 to 78 inches. Ranges that are much shorter or much longer than this—such as 40–60 or 70–90 or 80–100 inches—either push the CG too forward or too aft for the typical aircraft configurations these problems base on, and thus aren't representative of the common problem setup.

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://aircraftweightandbal.examzify.com

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