

Composite Materials 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 statement best describes the directional properties of composite materials?**
 - A. Direction-dependent**
 - B. Direction-independent**
 - C. Isotropic**
 - D. Uniform along axis**

- 2. Boron fibers are characterized by which property?**
 - A. Have a high bending stiffness, and cannot be easily woven into cloth or used for complex contoured parts**
 - B. Highly flexible and easy to weave into cloth**
 - C. Low stiffness and brittle**
 - D. Used mainly for insulation**

- 3. The typical ply thickness is expressed in which unit in this context?**
 - A. inches**
 - B. centimeters**
 - C. millimeters**
 - D. meters**

- 4. Aramid Nomex is used on which aircraft components?**
 - A. H-60 rotor blades and survivability wrap for F/A-18 external fuel drop tanks**
 - B. Fuselage skin panels**
 - C. Landing gear wheels**
 - D. Cockpit windows**

- 5. Aramid Kevlar systems are used in aircraft structures primarily in which way?**
 - A. Only in secondary structures, replacing fiberglass parts, or used as a hybrid with fiberglass**
 - B. Used in primary load-bearing wings only**
 - C. Only in engine components**
 - D. Only for exterior paint finish**

- 6. Under overload beyond ultimate yield, which statement is true about metals and composites?**
- A. Metals crack and break; composites disbond, crack or breaks**
 - B. Metals bend; composites melt**
 - C. Metals fuse; composites corrode**
 - D. Metals deform elastically; composites remain intact**
- 7. Which statement accurately describes composite usage in the F/A-18 and AV-8B?**
- A. F/A-18 uses 50% surface area; AV-8B uses 75% surface area and 26% of structural weight**
 - B. F/A-18 uses 75% surface area; AV-8B uses 50% surface area**
 - C. F/A-18 uses 10% surface area; AV-8B uses 90%**
 - D. F/A-18 uses 50% surface area; AV-8B uses 75% surface area and 26% of structural weight**
- 8. The term potting compound corresponds to which action?**
- A. Potting compound**
 - B. Conformal coating**
 - C. Encapsulate**
 - D. Fungus proof coating**
- 9. In fiber-reinforced composites, the matrix is defined as which of the following?**
- A. The material that holds fibers in laminate**
 - B. The reinforcing fibers themselves**
 - C. The voids within the laminate**
 - D. A coating applied to fibers**
- 10. Which option best represents the action of encapsulation?**
- A. Potting compound**
 - B. Encapsulate**
 - C. Conformal coating**
 - D. Fungus proof coating**

Answers

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

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Explanations

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1. Which statement best describes the directional properties of composite materials?

- A. Direction-dependent**
- B. Direction-independent**
- C. Isotropic**
- D. Uniform along axis**

Directional behavior is the defining feature of most composite materials. The fibers carry most of the load along their length, so stiffness and strength are highest in that direction, while the surrounding matrix provides support but offers much less stiffness transversely. This makes the material respond very differently depending on the loading direction relative to the fiber orientation. In a unidirectional composite, you can feel this contrast clearly: a strong, stiff response along the fiber direction, but a much softer response across it. That's why composites are anisotropic—they don't have the same properties in all directions. Saying the material is direction-dependent best captures this reality. Terms like direction-independent or isotropic would imply equal properties in every direction, which isn't the case for typical fiber-reinforced composites. And while a particular laminate could be uniform along one axis, the important point is the variation with direction due to fiber orientation.

2. Boron fibers are characterized by which property?

- A. Have a high bending stiffness, and cannot be easily woven into cloth or used for complex contoured parts**
- B. Highly flexible and easy to weave into cloth**
- C. Low stiffness and brittle**
- D. Used mainly for insulation**

Boron fibers are tested for their stiffness and formability. They have an exceptionally high bending stiffness, meaning they resist bending a lot. This makes them hard to drape, weave into cloth, or form around complex contours. They're also brittle, so bending and shaping can lead to cracking. This combination explains why they're not used for flexible fabrics or intricate shapes, and why the description of having high bending stiffness and being difficult to weave or contort best fits boron fibers.

3. The typical ply thickness is expressed in which unit in this context?

- A. inches**
- B. centimeters**
- C. millimeters**
- D. meters**

Ply thickness in composites is a very small dimension, so it's most practically described in inches (often as mils, thousandths of an inch). This keeps typical values like a few thousandths of an inch in a convenient, familiar range (such as 0.005-0.010 inches) that aligns with prepregs, manufacturing tolerances, and design manuals used in the industry. Using centimeters or meters would describe a thickness that's far too large, while millimeters are less common in standard references even though possible. That's why inches is the standard unit for typical ply thickness.

4. Aramid Nomex is used on which aircraft components?

- A. H-60 rotor blades and survivability wrap for F/A-18 external fuel drop tanks**
- B. Fuselage skin panels**
- C. Landing gear wheels**
- D. Cockpit windows**

Nomex, an aramid fiber, is prized in aerospace for high toughness and excellent flame/heat resistance, making it ideal for areas that must survive extreme conditions without adding excessive weight. In the H-60 helicopter, rotor blades use Nomex-reinforced composites to achieve the necessary fatigue and impact tolerance while keeping weight down. Around F/A-18 external fuel tanks, survivability wraps made from Nomex provide an extra layer of fire resistance, helping to contain or slow a fire in the event of damage. Other components—fuselage skin, landing gear wheels, and cockpit windows—rely on different material systems chosen for stiffness, strength, visibility, and wear characteristics rather than Nomex.

5. Aramid Kevlar systems are used in aircraft structures primarily in which way?

- A. Only in secondary structures, replacing fiberglass parts, or used as a hybrid with fiberglass**
- B. Used in primary load-bearing wings only**
- C. Only in engine components**
- D. Only for exterior paint finish**

Kevlar adds exceptional toughness and impact resistance to fiber-reinforced composites, meaning it can absorb energy and resist damage without failing, which is especially valuable for parts that aren't the main load carriers. In aircraft structures, this makes Kevlar a good fit for secondary structures such as interior panels, fairings, or exterior skins that don't carry the primary aerodynamic loads, and it's often used to replace fiberglass or blended with fiberglass to balance damage tolerance with weight and stiffness. For primary load-bearing wings, you want maximum stiffness and high strength-to-weight, which carbon fiber or glass fiber laminates typically provide, so Kevlar on its own is not the primary choice there. Engine components and exterior paint finishes have different performance demands—engine parts require stiffness and temperature resistance, while paint is a surface coating—so Kevlar isn't used as a coating or sole material in those cases.

6. Under overload beyond ultimate yield, which statement is true about metals and composites?

- A. Metals crack and break; composites disbond, crack or breaks**
- B. Metals bend; composites melt**
- C. Metals fuse; composites corrode**
- D. Metals deform elastically; composites remain intact**

When a material is loaded beyond its ultimate strength, metals typically fail after plastic deformation by cracking and eventual fracture. The metal's ductile nature allows deformation, but continued loading leads to crack initiation and propagation, resulting in fracture. In contrast, composites fail differently because they're made of distinct materials bonded together; the weakest link is often the interface between layers. Under overload, delamination (disbonding), along with matrix cracking or fiber breakage, are common failure modes in composites. So the true statement is that metals crack and break, while composites tend to disbond, crack, or break. Other options describe phenomena that aren't the primary failure modes under overload beyond ultimate yield: melting or fusing isn't how these materials fail structurally, and corrosion isn't the immediate mechanical outcome. Also, metals don't simply deform elastically beyond yield; they undergo plastic deformation before failing.

7. Which statement accurately describes composite usage in the F/A-18 and AV-8B?

- A. F/A-18 uses 50% surface area; AV-8B uses 75% surface area and 26% of structural weight**
- B. F/A-18 uses 75% surface area; AV-8B uses 50% surface area**
- C. F/A-18 uses 10% surface area; AV-8B uses 90%**
- D. F/A-18 uses 50% surface area; AV-8B uses 75% surface area and 26% of structural weight**

The main idea being tested is how composite usage is quantified for different aircraft, using both exterior surface-area fraction and the share of structural weight that is composite. The best description states that the F/A-18 uses composites on about half of its exterior surface area, while the AV-8B uses composites on about three-quarters of its surface area and about 26% of the structural weight. This aligns with the idea that the AV-8B relies more on composite skins to save weight and improve performance, while the F/A-18 has a lower surface-area composite share. Other numbers don't fit the measured usage pattern: they misstate either the F/A-18's surface-area fraction or the AV-8B's combination of surface-area and structural-weight composite content.

8. The term potting compound corresponds to which action?

- A. Potting compound**
- B. Conformal coating**
- C. Encapsulate**
- D. Fungus proof coating**

Potting compound is used to encapsulate an electronic assembly. The action is to completely surround the components by pouring or injecting the compound into a housing and letting it cure, so the device sits embedded in the material. This provides environmental and mechanical protection, electrical insulation, and often vibration damping. It differs from conformal coating, which is a thin protective layer on the surfaces rather than filling and enclosing the internals. Fungus-proof coating is unrelated to the encapsulation process.

9. In fiber-reinforced composites, the matrix is defined as which of the following?

- A. The material that holds fibers in laminate**
- B. The reinforcing fibers themselves**
- C. The voids within the laminate**
- D. A coating applied to fibers**

In fiber-reinforced composites, the matrix is the continuous phase that surrounds and binds the reinforcing fibers, holding the laminate together and transferring loads between fibers. It fills the spaces, provides shape and environmental protection, and helps define thermal and chemical resistance. The reinforcement is the fibers themselves, chosen for high strength and stiffness, which carry most of the load once bonded to the matrix. Voids are air pockets that weaken the material, not the matrix. A coating applied to fibers (sizing) aids bonding but isn't the matrix. So the material that holds the fibers in the laminate is the matrix.

10. Which option best represents the action of encapsulation?

- A. Potting compound**
- B. Encapsulate**
- C. Conformal coating**
- D. Fungus proof coating**

Encapsulation is the process of enclosing an object inside a protective material to isolate it from the environment. The option that matches this action is the verb form "encapsulate," which directly describes the act of enclosing. A potting compound is the material used to do the encapsulating, not the action itself. A conformal coating is a thin protective layer applied to surfaces and does not enclose the object, while a fungus-proof coating refers to a coating with antifungal properties, not the act of encapsulating. So the word that best represents the action is encapsulate.

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://compositematerials.examzify.com>

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

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