Welding Metallurgy 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. Describe the filler wire used in SAW.

- **A. A solid metal electrode that may be non-coated or provided with a thin layer of copper on mild steel, and alloyed steel wires to prevent rusting.**
- **B. A flux-coated electrode.**
- **C. A hollow tubular wire.**
- **D. A solid copper wire.**

2. In the SAW filler metal wire code EL8K, what does the letter L indicate?

- **A. Low manganese**
- **B. Medium manganese**
- **C. High manganese**
- **D. Very low carbon**

3. What is the primary purpose of a Procedure Qualification Record (PQR)?

- **A. It provides a record of the welding performed under a WPS and demonstrates that the welding procedure meets prescribed quality standards.**
- **B. It outlines supplier material properties.**
- **C. It lists the welder's job duties.**
- **D. It describes post-weld cleaning requirements.**

4. Using DCEN polarity in SAW improves which aspects?

- **A. Deposition rate and/or penetration.**
- **B. Only increases penetration.**
- **C. Always reduces deposition rate.**
- **D. No effect on deposition rate.**

5. How is the type of destructive testing determined?

- **A. The code or company will specify the number of tests, locations of testing, and testing methods to be used.**
- **B. The tester selects methods randomly.**
- **C. Only tensile tests are always required.**
- **D. Destructive testing is optional.**

6. How can filler wire be fed in GTAW?

A. Manually or automatically

B. Only manually

C. Only automatically

D. Not used at all

7. For which processes is the flux type typically identified in the WPS?

A. Processes such as SAW, electroslag and electrogas.

B. SMAW and TIG only.

C. MIG and FCAW without flux.

D. Plasma cutting.

8. Which statement describes a series connection?

A. Two wires are fed simultaneously through one wire feeder connected to a single power source

B. The wires are connected in series using two wire feeders and a single power source

C. The current goes from power source to base metal, etc

D. Two separate power sources feed the two wires independently

9. Why is spot welding often chosen over riveting or screwing?

A. It is faster

B. It produces stronger joints in all cases

C. It requires more labor

D. It is cheaper for all materials

10. In FCAW, which polarity is used to maximize penetration?

A. DCEP

B. DCEN

C. AC

D. None of the above

Answers

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

Explanations

1. Describe the filler wire used in SAW.

A. A solid metal electrode that may be non-coated or provided with a thin layer of copper on mild steel, and alloyed steel wires to prevent rusting.

B. A flux-coated electrode.

C. A hollow tubular wire.

D. A solid copper wire.

In submerged arc welding, the filler material is a continuously fed solid wire electrode, with shielding provided by a granular flux applied from above rather than by coating the electrode. The wire itself is a solid metal conductor and can be bare or have a thin copper coating. The copper layer helps with electrical contact, reduces oxidation during feeding, and alloying can be used to improve rust resistance. Hollow tubes are used for flux-cored welding, and a flux-coated electrode is typical of other processes like SMAW, so they're not describing SAW. Therefore, the filler wire is best described as a solid metal electrode that may be non-coated or copper-coated, with possible alloying to prevent rust.

2. In the SAW filler metal wire code EL8K, what does the letter L indicate?

A. Low manganese

B. Medium manganese

C. High manganese

D. Very low carbon

The letters in the SAW filler metal wire code indicate the level of a specific alloying element in the wire. In EL8K, the L shows that manganese content is in the low range. This designation helps you choose a filler metal whose manganese level matches the welding needs: low manganese affects deoxidation, strength, and ductility of the weld metal, and is chosen when you want better ductility or to suit a low-manganese base metal. It does not refer to carbon content, nor does it imply medium or high manganese—those levels would be shown by different letters.

3. What is the primary purpose of a Procedure Qualification Record (PQR)?

A. It provides a record of the welding performed under a WPS and demonstrates that the welding procedure meets prescribed quality standards.

B. It outlines supplier material properties.

C. It lists the welder's job duties.

D. It describes post-weld cleaning requirements.

A Procedure Qualification Record is a documented record that proves a welding procedure has been tested and meets the required quality standards. It captures the actual welding performed under a specific Welding Procedure Specification, along with the test results and conditions (materials, joint design, thickness, process, preheat, heat input, and other parameters). The purpose is to show that, under defined conditions, the procedure can consistently produce sound welds, which then validates the procedure for production use. This record also provides traceability, so the same WPS can be relied upon for ongoing fabrication. Materials properties, welder duties, or post-weld cleaning requirements on their own are not what the PQR is intended to document.

4. Using DCEN polarity in SAW improves which aspects?

A. Deposition rate and/or penetration.

B. Only increases penetration.

C. Always reduces deposition rate.

D. No effect on deposition rate.

Using DCEN polarity in SAW shifts most of the heat into the workpiece because the electrode is negative and the base metal is positive. That higher heat input at the weld zone tends to give deeper penetration, which is why penetration is improved. At the same time, the way the filler metal is transferred and melted into the weld pool under this polarity can increase how efficiently filler metal is deposited into the weld, boosting the deposition rate. So this polarity can enhance either or both aspects depending on the process setup and material, making it the best choice when deeper penetration or higher metal deposition is desirable.

5. How is the type of destructive testing determined?

A. The code or company will specify the number of tests, locations of testing, and testing methods to be used.

B. The tester selects methods randomly.

C. Only tensile tests are always required.

D. Destructive testing is optional.

The plan for destructive testing is determined by the governing code or the project contract. Those documents specify how many specimens to test, where to sample from (locations in the weld or coupon), and which testing methods to use. This ensures the testing is consistent, auditable, and aligned with the required performance and safety criteria for the welds. Codes and contracts set up a standardized testing plan so everyone follows the same procedures, rather than leaving testing to chance or the tester's preference. Tensile tests aren't the only required method in many cases, and destructive testing isn't something you opt into arbitrarily—the requirements are typically mandatory to verify compliance with the specified properties and acceptance criteria.

6. How can filler wire be fed in GTAW?

A. Manually or automatically

B. Only manually

C. Only automatically

D. Not used at all

In GTAW, filler wire can be added in two ways: manually or with an automatic wire feeder. In manual TIG welding, the filler rod is held with a tongs and fed into the molten pool by hand, with the deposition rate controlled by the welder's feeding speed and distance from the arc. In TIG welding with a wire feeder, a spool of filler wire is fed automatically into the arc at a controlled rate, providing consistent deposition and is common in automated or high-speed applications. Some setups let you switch between these modes as needed, or use both depending on the weld requirements.

7. For which processes is the flux type typically identified in the WPS?

A. Processes such as SAW, electroslag and electrogas.

B. SMAW and TIG only.

C. MIG and FCAW without flux.

D. Plasma cutting.

Flux type in a Welding Procedure Specification is specified for processes that rely on a separate flux material to protect the weld and influence its chemistry. Submerged arc welding uses a granular flux that blankets the arc and forms slag, so the exact flux composition must be identified in the WPS. Electroslag welding depends on flux-related materials to create the slag pool and electrolyte environment that drive the weld, making the flux specification essential. Electrogas welding also involves flux-related materials that affect arc behavior and slag formation, so the flux type is typically listed there as well. In contrast, methods that don't rely on an external flux—such as welding with solid filler wire under a shielding gas or processes like TIG—do not require a flux type to be specified in the WPS, and plasma cutting isn't a welding process, so flux isn't identified there.

8. Which statement describes a series connection?

A. Two wires are fed simultaneously through one wire feeder connected to a single power source

B. The wires are connected in series using two wire feeders and a single power source

C. The current goes from power source to base metal, etc

D. Two separate power sources feed the two wires independently

In a series connection, the current has one path to follow through every component, so the same current flows through each part and the voltages across them add up to the source voltage. When two wire feeders are connected in series to a single power source, the welding current goes through the first feeder, then through the second feeder, and finally to the work, forming one continuous current path. This single-path, same-current arrangement is what defines a series setup. The other scenarios describe different setups: feeding two wires in parallel from one feeder would not force the same current through both in a single path; having two separate power sources feeding the wires independently creates separate paths with separate sources. The described option matches the idea of one current path through both feeders, powered by one source.

9. Why is spot welding often chosen over riveting or screwing?

A. It is faster

B. It produces stronger joints in all cases

C. It requires more labor

D. It is cheaper for all materials

Spot welding is chosen because it is extremely fast, especially on production lines that use thin sheet metal. The process can be automated and creates many welds in a fraction of a second per spot, with minimal handling and no need to fit, drill, or torque fasteners. This speed and simplicity dramatically reduce assembly time compared with riveting or screwing, which require holes, fasteners, and more manual labor. Riveting and screwing involve additional steps—drilling or punching holes, inserting fasteners, and applying torque or riveting force—which adds setup time and labor. While those methods have their own advantages in other situations, they're not as quick or as easily automated for many thin-sheet assemblies. Strength and suitability depend on specifics of materials and load, so spot welds aren't universally the strongest option, but for many high-volume applications, the speed advantage is the key reason it's preferred.

10. In FCAW, which polarity is used to maximize penetration?

A. DCEP

B. DCEN

C. AC

D. None of the above

Polarity controls how arc heat is distributed between the workpiece and the electrode. When the electrode is positive and current is direct, most of the heat goes into the base metal, which increases penetration and fusion at the root. In contrast, having the electrode negative shifts more heat into the consumable wire, producing shallower penetration. Alternating current distributes heat differently and generally does not maximize penetration. So, to achieve maximum penetration in FCAW, you use direct current with the electrode positive.

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://weldingmetallurgy.examzify.com

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