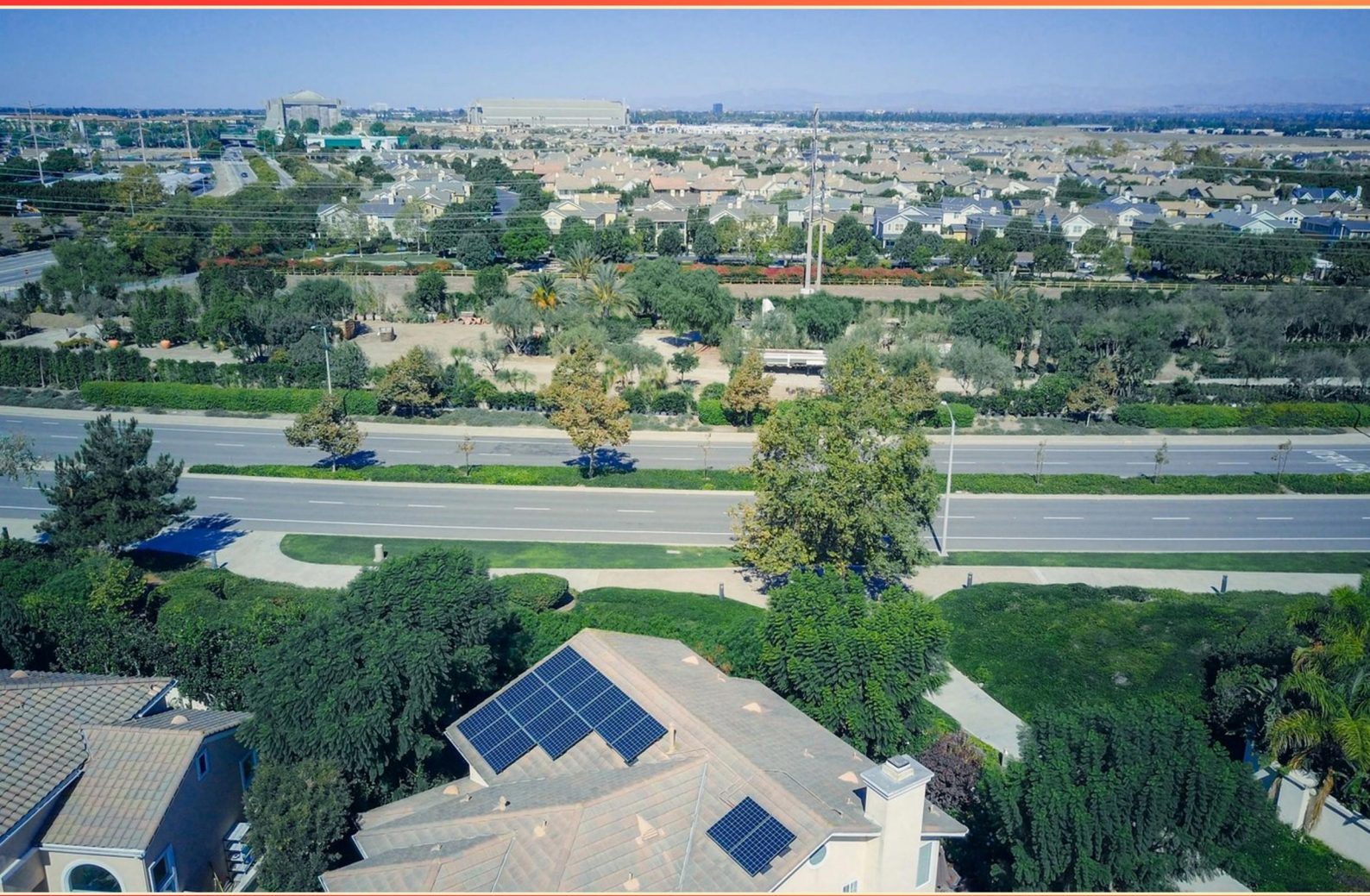
NATIONAL ELECTRICAL CODE (NEC) ARTICLE 690 PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

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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 should equipment grounding conductors for photovoltaic (PV) system circuits be sized?

A. Based on the total circuit load

B. According to manufacturer specifications

C. In accordance with NEC guidelines

D. In accordance with 250.122

2. What is the minimum height above grade for equipment containing PV system DC circuits greater than 1,000V installed on the exterior of buildings?

A. 5 ft

B. 8 ft

C. 10 ft

D. 12 ft

3. Which component of a PV system consolidates multiple source circuits into a single output?

A. A combiner box

B. An inverter

C. A circuit breaker

D. A transformer

4. Which safety device is required in all PV systems according to Article 690?

A. A surge protector

B. A disconnecting means or switch

C. An overload relay

D. A circuit breaker

5. How does the National Electrical Code (NEC) address roof-mounted PV systems?

A. It specifies only the installation angle

B. It provides guidelines for mountings, clearances, and structural integrity requirements

C. It allows for any mounting method

D. It only addresses wiring issues

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6. What marking requirement is specified for junction boxes in Article 690?

A. They should be affixed with a removable label

B. They must be marked to identify their connection to a PV system

C. They need to be color-coded

D. No marking is necessary

7. In PV systems, what does the grounding electrode system connect to?

A. The solar panels directly

B. Utility lines for grounding

C. The building's electrical services

D. Equipment that generates excess electricity

8. What is the general requirement for isolating devices used in PV systems regarding their listing?

A. They must be mobile

B. They must be listed and identified for specific use

C. They should be standard household devices

D. They can be generic tools

9. How is the maximum dc voltage for a PV source circuit calculated?

A. By adding the voltage ratings of all modules

B. Using the average voltage rating of the modules

C. Corrected for the lowest expected ambient temperature

D. Only according to manufacturer guidelines

10. How must DC wiring systems be installed for safety according to Article 690?

A. DC wiring must be underground.

B. DC wiring must be weatherproofed and protected against physical damage.

C. DC wiring must follow the same rules as AC wiring.

D. DC wiring must be insulated with rubber only.

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Answers

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

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Explanations

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1. How should equipment grounding conductors for photovoltaic (PV) system circuits be sized?

A. Based on the total circuit load

B. According to manufacturer specifications

C. In accordance with NEC guidelines

D. In accordance with 250.122

The appropriate approach to sizing equipment grounding conductors for photovoltaic (PV) system circuits is specified in NEC 250.122. This provision outlines the criteria for determining the minimum size of equipment grounding conductors based on the rating of the overload protective device. It ensures that the grounding conductors are adequately sized to facilitate the effective clearing of ground faults, enhancing safety and functionality in the system. By following the guidelines in 250.122, the grounding conductor can properly handle fault currents without compromising the integrity of the PV system or the safety of individuals. This standardization takes into account various system configurations and helps to ensure a consistent application across different installations, thus reducing risks associated with improper grounding. While other options may mention generic circuit loads or manufacturer specifications, these do not provide the authoritative and standardized approach that NEC guidelines and specifically Article 250.122 do, making it essential for compliance and safety in PV installations.

2. What is the minimum height above grade for equipment containing PV system DC circuits greater than 1,000V installed on the exterior of buildings?

A. 5 ft

B. 8 ft

C. 10 ft

D. 12 ft

The minimum height above grade for equipment containing photovoltaic (PV) system direct current (DC) circuits greater than 1,000 volts installed on the exterior of buildings is specified to be 10 feet. This requirement is aimed at ensuring safety by providing a clear space that helps prevent accidental contact with energized components. The 10-foot height requirement serves to mitigate risks associated with the high voltage present in these systems, reducing the likelihood of accidental electrocution or contact by pedestrians, maintenance personnel, or anyone accessing the area around the installation. This height is in alignment with the overarching safety and accessibility principles outlined in the National Electrical Code (NEC), particularly for high-voltage installations, as these systems can pose significant hazards. It reflects the need for established standards to protect both individuals and property in the vicinity of electrical systems. The other height options do not meet the NEC's safety standards for installations dealing with DC circuits above 1,000 volts.

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3. Which component of a PV system consolidates multiple source circuits into a single output?

A. A combiner box

B. An inverter

C. A circuit breaker

D. A transformer

In a photovoltaic (PV) system, the component responsible for consolidating multiple source circuits into a single output is the combiner box. This device is designed to take multiple inputs—typically the outputs from various solar panels—and combine them into one or more output circuit paths. This consolidation simplifies wiring and reduces the number of wires that need to be run to the inverter or other components downstream in the system. The combiner box typically contains fuses or circuit breakers to protect each source circuit and can also include monitoring and surge protection features. By ensuring that the connections from multiple source circuits are well-organized and secure, the combiner box enhances the overall safety and efficiency of the PV system. Other components listed, such as the inverter, are key to converting the direct current (DC) generated by the solar panels into alternating current (AC) for use in homes and businesses, but they do not perform the function of merging multiple source circuits into one. Circuit breakers are protective devices that interrupt electrical flow under fault conditions, while transformers are used to change voltage levels in an electrical system, but neither consolidates source circuits like a combiner box does.

4. Which safety device is required in all PV systems according to Article 690?

A. A surge protector

B. A disconnecting means or switch

C. An overload relay

D. A circuit breaker

In photovoltaic (PV) systems, Article 690 of the National Electrical Code (NEC) mandates the inclusion of a disconnecting means or switch as a critical safety device. This requirement is essential for ensuring both the safety of maintenance personnel and the overall safety of the installation. The disconnecting means enables the system to be safely isolated from the electrical supply, which is particularly important during maintenance or emergencies. It allows workers to cut off power to the solar array and associated equipment to prevent electric shock or other hazards. This switch must be easily accessible to allow quick operation when necessary. By requiring a disconnecting means, the NEC prioritizes safety in the design and installation of PV systems. It establishes a standardized way to ensure that any work performed on the system can be done without risk of electrocution. Other safety devices, while important, do not fulfill this specific role, making the disconnecting means a unique and necessary requirement within Article 690.

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5. How does the National Electrical Code (NEC) address roof-mounted PV systems?

A. It specifies only the installation angle

B. It provides guidelines for mountings, clearances, and structural integrity requirements

C. It allows for any mounting method

D. It only addresses wiring issues

The National Electrical Code (NEC) provides comprehensive guidelines for roof-mounted photovoltaic (PV) systems to ensure safety and effectiveness. The correct choice highlights that the NEC addresses multiple aspects of installation, including the mounting, clearances, and requirements for structural integrity. Specifically, these guidelines ensure that the PV systems are securely attached to rooftops, which helps prevent damage to both the system and the building. The clearances specified are crucial for maintenance and safety reasons, allowing for adequate airflow and accessibility to the solar panels. Additionally, structural integrity requirements ensure that the roof can support the weight of the equipment, factoring in dynamic loads such as wind and snow. By providing these detailed guidelines, the NEC ensures that installations are safe, effective, and compliant with building codes, thus promoting the reliable operation of solar energy systems. This approach helps to protect not only the integrity of the PV system but also the overall safety of the building and its occupants.

6. What marking requirement is specified for junction boxes in Article 690?

A. They should be affixed with a removable label

B. They must be marked to identify their connection to a PV system

C. They need to be color-coded

D. No marking is necessary

Junction boxes associated with photovoltaic (PV) systems must be marked to indicate their connection to the PV system as stipulated in Article 690 of the National Electrical Code (NEC). This requirement is crucial for several reasons. Firstly, proper marking facilitates the identification of components that are part of the PV system, which is essential during maintenance, inspection, and emergency situations. It helps ensure that any workers or technicians interacting with the system are aware that they are working with solar technology, which can have different voltage and safety considerations compared to conventional electrical systems. Secondly, marking junction boxes contributes to the overall safety of the electrical installation. By clearly identifying these junction boxes as part of a PV system, it reduces the risk of accidental disconnection or interference with the solar equipment, which could lead to inefficiencies or safety hazards. These marking requirements are aligned with the NEC's objective of promoting safety and ensuring clear communication about the systems in use. Thus, the marking directly enhances the reliability and safety of PV system installations.

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7. In PV systems, what does the grounding electrode system connect to?

A. The solar panels directly

B. Utility lines for grounding

C. The building's electrical services

D. Equipment that generates excess electricity

In photovoltaic (PV) systems, the grounding electrode system is essential for ensuring safety and compliance with the National Electrical Code (NEC). The grounding electrode system connects to the building's electrical services to establish a common ground reference. It helps protect the system from lightning strikes, over-voltages, and electrical faults by safely directing any faults to the ground, thereby minimizing the risk of electrical shock or fire. By connecting the grounding electrode system to the building's electrical services, it ensures that all electrical components within the system, including the inverter and other equipment, are at the same electrical potential as the building's grounding system. This integration prevents differences in voltage between the solar equipment and the existing electrical system, reducing the risk of damage and ensuring reliable operation of the PV system. The other options do not align with the purpose of the grounding electrode system. Connecting directly to solar panels or utility lines does not provide the necessary safety measures outlined in the NEC. Connecting to equipment generating excess electricity would not create a secure grounding path, risking potential hazards. Thus, grounding the PV system through the building's electrical services is critical for effective safety and operation.

8. What is the general requirement for isolating devices used in PV systems regarding their listing?

A. They must be mobile

B. They must be listed and identified for specific use

C. They should be standard household devices

D. They can be generic tools

In photovoltaic (PV) systems, isolating devices are crucial for ensuring safety and functionality during maintenance and emergency situations. The general requirement regarding these devices is that they must be listed and identified for specific use. This means that isolating devices should meet specific performance standards and be tested to ensure they are suitable for their intended application within the PV system. Devices that are listed for specific use are typically designed and manufactured to handle the unique electrical parameters and environmental conditions encountered in solar power applications. These devices are assessed through certification processes, demonstrating that they comply with relevant safety and performance standards established by recognized testing laboratories. Using devices that are properly listed and identified significantly reduces the risks associated with electrical malfunctions, improves safety for personnel, and ensures compliance with the National Electrical Code (NEC). This requirement also helps streamline inspections and audits by ensuring that all equipment used in the system is suitable and reliable for its intended purpose.

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9. How is the maximum dc voltage for a PV source circuit calculated?

A. By adding the voltage ratings of all modules

B. Using the average voltage rating of the modules

C. Corrected for the lowest expected ambient temperature

D. Only according to manufacturer guidelines

The maximum DC voltage for a photovoltaic (PV) source circuit is calculated by considering the effects of the lowest expected ambient temperature. This is important because as the temperature decreases, the voltage output of the PV modules can increase due to the negative temperature coefficient of the materials used in solar cells. When assessing the maximum voltage, it's essential to take into account this potential rise in voltage during colder conditions, as it can affect the system's safety and performance. The calculation ensures that the system components, like inverters, breakers, and wiring, can handle these higher voltages without risk of failure or fire. While the voltage ratings of the modules and manufacturer guidelines provide useful information, they do not directly address the effects of temperature on voltage output. The average voltage rating does not accurately reflect the maximum voltage that can occur during extreme temperature conditions, which is why the correct approach is to adjust for these ambient temperature conditions. This consideration helps ensure that installations comply with safety standards and operate effectively under varying weather conditions.

10. How must DC wiring systems be installed for safety according to Article 690?

A. DC wiring must be underground.

B. DC wiring must be weatherproofed and protected against physical damage.

C. DC wiring must follow the same rules as AC wiring.

D. DC wiring must be insulated with rubber only.

DC wiring systems must be installed in a way that provides adequate protection against environmental factors and potential physical damage. Article 690 emphasizes the importance of ensuring that DC wiring is weatherproofed, which refers to its ability to withstand exposure to moisture and other elements without compromising safety or functionality. Additionally, these wiring systems need to be safeguarded against physical damage, which means they should be installed in a manner that minimizes the risk of mechanical impact or abrasions that could lead to failures or hazards. The requirement for DC wiring to be weatherproofed and physically protected is critical, particularly for solar power installations, where wiring is often exposed to outdoor conditions. By ensuring that the wiring can resist both environmental wear and mechanical stress, safety is enhanced, fulfilling the NEC guidelines intended to protect persons and property. This underscores the importance of proper installation practices specific to DC wiring systems.

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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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