

Michigan Journeyman Practice Test (Sample)

Study Guide



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Questions

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- 1. Which factor should be considered when selecting electrical cables?**
 - A. Color coding of the wire**
 - B. Voltage rating and environment**
 - C. Length of the installation**
 - D. Cost of materials**

- 2. A feeder in a single-family dwelling supplies a load of 75 A of electrical space heating and 25 A of air conditioning. The required capacity of the feeder is ____ amps?**
 - A. 80**
 - B. 90**
 - C. 100**
 - D. 75**

- 3. What type of boxes should be used in the floor for installations?**
 - A. Generic**
 - B. Listed**
 - C. Non-metallic**
 - D. Custom-made**

- 4. General purpose receptacles are prohibited from being installed on which of the following?**
 - A. Northeast side of the pool**
 - B. Directly south of the pool**
 - C. North side of the dwelling**
 - D. East side of the fence**

- 5. Which regulation mandates that all electrical installations comply with safety measures?**
 - A. OSHA regulations**
 - B. NEC regulations**
 - C. EPA standards**
 - D. ICR guidelines**

- 6. How often should electrical equipment be inspected?**
- A. Every five years**
 - B. Every month**
 - C. Annually or as specified by manufacturer guidelines**
 - D. Only when problems arise**
- 7. What type of raceways are required for DC photovoltaic source or output current inside a building?**
- A. PVC**
 - B. Non-metallic**
 - C. Metal**
 - D. Flexible**
- 8. What does a circuit need to be considered a "correctly grounded" system?**
- A. A proper connection to the earth ground**
 - B. Isolated from other circuits**
 - C. Grounded to the neutral wire**
 - D. Disconnected from the power source**
- 9. What is the required length for the cord of a garbage disposal when installed with a cord and attachment plug?**
- A. No less than 12 inches, no more than 24 inches**
 - B. No less than 18 inches, no more than 36 inches**
 - C. No less than 24 inches, no more than 48 inches**
 - D. No less than 30 inches, no more than 50 inches**
- 10. What color insulation typically indicates a ground wire?**
- A. Red**
 - B. Black**
 - C. Green or bare**
 - D. White**

Answers

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

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Explanations

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1. Which factor should be considered when selecting electrical cables?

- A. Color coding of the wire
- B. Voltage rating and environment**
- C. Length of the installation
- D. Cost of materials

When selecting electrical cables, the voltage rating and environment are crucial factors to consider. The voltage rating ensures that the cable can handle the electrical load without risk of breakdown or failure. Different types of cables are designed to operate at specific voltage levels, and using a cable with an inadequate rating can lead to overheating, potentially causing insulation failure or even fire hazards. Additionally, the environment where the cables will be installed significantly impacts the choice of cable materials and insulation types. For example, cables used in outdoor settings may need to be resistant to moisture, UV exposure, or temperature fluctuations, while those in industrial environments might require features that protect against chemicals or mechanical stresses. Selecting cables that meet both the voltage requirements and environmental conditions ensures safety, reliability, and longevity of the electrical installation.

2. A feeder in a single-family dwelling supplies a load of 75 A of electrical space heating and 25 A of air conditioning. The required capacity of the feeder is ____ amps?

- A. 80**
- B. 90
- C. 100
- D. 75

To determine the required capacity of the feeder for a single-family dwelling supplying an electrical space heating load of 75 A and an air conditioning load of 25 A, it's essential to understand how to calculate the total demand on the feeder. For electric space heating, the full load amperage is typically used in the calculation, which is 75 A. However, as per the National Electrical Code (NEC) guidelines regarding air conditioning, you can apply a demand factor to the air conditioning load. The NEC allows a reduction in the air conditioning load for feeders. In most cases, only half of the air conditioning load is considered for demand calculations, leading to an additional 12.5 A ($25 \text{ A} / 2$). Adding these two components together gives you: - Full load for heating: 75 A - Demand for air conditioning: 12.5 A (half of 25 A) When you sum these, the total demand on the feeder becomes $75 \text{ A} + 12.5 \text{ A} = 87.5 \text{ A}$. According to the sizing rules, it is common practice to round up to the nearest available standard size for feeders. In this instance, the nearest standard size over 87.5 A is 90

3. What type of boxes should be used in the floor for installations?

- A. Generic**
- B. Listed**
- C. Non-metallic**
- D. Custom-made**

In electrical installations, using listed boxes is crucial for compliance with safety standards and regulations. A listed box has been tested and evaluated by a recognized testing laboratory to ensure it meets specific performance and safety requirements. This means it has been designed to handle the electrical loads and environmental conditions it's likely to encounter in a typical installation. Listed boxes are often made from materials that provide durability and safety, such as metal or high-grade plastic, depending on the application. They are also marked with relevant information that confirms their compliance with industry standards, making it easier for electricians and inspectors to verify their suitability for installation. In contrast, generic boxes may not have undergone the same rigorous testing, posing potential safety risks during operation. Non-metallic boxes, while they can sometimes be considered for certain installations, must still be listed to ensure they can safely house electrical connections. Custom-made boxes might not align with standardized tests for safety and could lead to issues with inspections or long-term functionality. Therefore, relying on listed boxes ensures that the installation adheres to legal requirements and promotes safety.

4. General purpose receptacles are prohibited from being installed on which of the following?

- A. Northeast side of the pool**
- B. Directly south of the pool**
- C. North side of the dwelling**
- D. East side of the fence**

General-purpose receptacles are prohibited from being installed directly south of the pool due to safety codes related to electrical installations in proximity to water. The primary concern lies in the potential risk of electric shock or electrocution. According to the National Electrical Code (NEC) and other local codes, receptacles must be installed at safe distances from water bodies, particularly pools, to reduce any chance of water infiltration into electrical devices. When a receptacle is placed directly south of the pool, it could potentially be in an area where water splashes or runoff is most likely to reach it, especially when considering weather conditions, users exiting the water, or other factors that can lead to a wet environment. Ensuring that electrical devices are not in these hazardous locations helps to enhance safety for users and prevent electrical accidents. In contrast, other locations, such as the northeast side of the pool, the north side of the dwelling, and the east side of the fence, may not carry the same associated risks concerning water exposure in direct proximity to the pool, making the prohibition specific to the area directly south of the pool significantly important in adhering to safety practices.

5. Which regulation mandates that all electrical installations comply with safety measures?

- A. OSHA regulations**
- B. NEC regulations**
- C. EPA standards**
- D. ICR guidelines**

The National Electrical Code (NEC) regulations are critical because they set forth comprehensive requirements and standards for the safe installation of electrical wiring and equipment. These regulations are designed to protect both individuals and property from electrical hazards, such as shock, fire, and equipment failure. The NEC is adopted by many states and local jurisdictions across the United States, including Michigan, to ensure that electrical installations adhere to recognized safety measures. The code is revised periodically to incorporate new technologies and practices that enhance electrical safety. Compliance with NEC regulations promotes uniformity and safety in electrical systems, significantly reducing the risks associated with electrical installations. In contrast, OSHA regulations focus more on workplace safety and health standards across various industries but do not specifically govern the technical details of electrical installations. EPA standards pertain to environmental protection and do not cover electrical safety measures. ICR guidelines may reference certain electrical safety practices in their broader context but do not encompass the full scope of safety regulations established by the NEC. Therefore, the NEC is the most relevant regulation for ensuring that all electrical installations comply with proper safety measures.

6. How often should electrical equipment be inspected?

- A. Every five years**
- B. Every month**
- C. Annually or as specified by manufacturer guidelines**
- D. Only when problems arise**

Electrical equipment should be inspected annually or according to the specifications provided by the manufacturer. This approach is essential for ensuring safety, reliability, and compliance with applicable codes and standards. Regular inspections help to identify potential issues before they become serious problems, thereby reducing the risk of electrical failures or hazards. Manufacturer guidelines often include details on the required inspection frequency based on the equipment's usage and operating conditions, which may vary significantly depending on the type of equipment and its environment. Following these recommendations ensures that the equipment operates efficiently and safely throughout its intended lifespan. Regular inspections facilitate timely maintenance and can help extend the life of the equipment, minimize downtime, and ensure compliance with industry standards.

7. What type of raceways are required for DC photovoltaic source or output current inside a building?

- A. PVC**
- B. Non-metallic**
- C. Metal**
- D. Flexible**

The requirement for metal raceways for DC photovoltaic source or output current inside a building is based on safety and performance considerations. Metal raceways provide a number of advantages in this application. Firstly, metal raceways have superior grounding capabilities which are crucial for the safe operation of electrical systems. Grounding helps prevent electrical shocks and can facilitate the function of overcurrent protection devices in the event of a fault. This is particularly important in photovoltaic systems that deal with direct current (DC), which can present unique challenges in terms of arcing and fault conditions. Secondly, metal raceways offer protection against physical damage, which is essential in ensuring the integrity and safety of the wiring system, especially when it carries a substantial amount of current and is part of a solar power installation, where exposure to environmental conditions might be a concern. Additionally, metal raceways can reduce the risk of electromagnetic interference (EMI) that might affect the performance of sensitive equipment often associated with photovoltaic systems. While other materials may be suitable for certain electrical applications, the specific requirements of DC photovoltaic systems typically dictate the use of metal raceways within buildings for optimal safety and performance.

8. What does a circuit need to be considered a "correctly grounded" system?

- A. A proper connection to the earth ground**
- B. Isolated from other circuits**
- C. Grounded to the neutral wire**
- D. Disconnected from the power source**

For a circuit to be considered a "correctly grounded" system, it must establish a proper connection to the earth ground. This grounding serves multiple critical purposes, including providing a safe path for fault currents, stabilizing voltage levels, and protecting both equipment and individuals from electrical hazards. By connecting to the earth, the circuit ensures that excess voltage can dissipate safely, which is fundamental for maintaining the integrity and safety of electrical systems. While isolation from other circuits, grounding to the neutral wire, and disconnecting from the power source are relevant concepts in electrical safety and design, they do not define what constitutes a properly grounded system. Isolation might help with certain safety measures, grounding to the neutral can lead to potential hazards if not done appropriately, and disconnecting from the power source interrupts the functionality of the circuit entirely, thus not addressing the grounding aspect. Grounding provides the essential safety connection to the earth, which is indispensable for a functioning and compliant electrical system.

9. What is the required length for the cord of a garbage disposal when installed with a cord and attachment plug?

- A. No less than 12 inches, no more than 24 inches**
- B. No less than 18 inches, no more than 36 inches**
- C. No less than 24 inches, no more than 48 inches**
- D. No less than 30 inches, no more than 50 inches**

The required length for the cord of a garbage disposal when installed with a cord and attachment plug is specified to be no less than 18 inches and no more than 36 inches. This length ensures that the disposal can be connected easily to a nearby outlet while also allowing for some flexibility in the kitchen layout. The guidelines aim to prevent strain on the cord, reduce the risk of electrical hazards, and accommodate the typical positioning of outlets in relation to appliances. The specification of cord length is important for safety and functionality. A cord that is too short may cause stress on the connections or may not reach the outlet, leading to the potential for improper installation. Conversely, a cord that is too long may create unnecessary slack, which could be hazardous, making it easier for the cord to become damaged or tangled during use. Compliance with these standards helps ensure safe and effective operation of the appliance.

10. What color insulation typically indicates a ground wire?

- A. Red**
- B. Black**
- C. Green or bare**
- D. White**

In electrical wiring, the color of insulation is standardized to indicate the function of each wire within a circuit. Ground wires are specifically designated for safety, providing a path for electrical current to safely return to the ground in case of a fault in the system. The correct answer is grounded in these standards, where the color green or bare (without insulation) is explicitly used to designate ground wires. This ensures that anyone working with or installing electrical systems can easily identify which wires are meant for grounding purposes, thereby enhancing safety and preventing accidental electrical shocks or malfunctions. Other colors, such as red, black, and white, are commonly used for different functions; for instance, black is often used for hot wires and white for neutral. Therefore, understanding these color codes is vital for anyone working in electrical installations and maintenance.