# New York City DOB Master Electrician Practice Exam (Sample)

## Study Guide

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# Questions

1. **Over a hot tub protected by GFCI, what is the required mounting height for light fixtures supported by EMT in NYC?**
   - **A. Less than 6 inches**
   - **B. At least 2 feet**
   - **C. At least 5 feet**
   - **D. Not allowed**

2. **Which device must not be connected to the lighting circuit in the elevator hoistway pit?**
   - **A. Light switch**
   - **B. Ground-fault circuit interrupter**
   - **C. Receptacle**
   - **D. Emergency light**

3. **What is the minimum space required between the top of a switchboard and any combustible ceiling if the switchboard is not fully enclosed?**
   - **A. 24 inches**
   - **B. 30 inches**
   - **C. 36 inches**
   - **D. 42 inches**

4. **What is the appropriate amperage for fixed in-place X-ray equipment supplied through an attachment plug cap?**
   - **A. 20 Amps**
   - **B. 30 Amps**
   - **C. 40 Amps**
   - **D. 50 Amps**

5. **What happens if the voltage drop exceeds the maximum allowable percentage for a dwelling unit?**
   - **A. It still operates normally**
   - **B. It can damage the electrical equipment**
   - **C. It improves efficiency**
   - **D. It is considered safe**

6. **What is the minimum horizontal climbing space provided by conductors on poles, where power conductors are below communication conductors?**
   - A. 24 inches
   - B. 30 inches
   - C. 36 inches
   - D. 48 inches

7. **What is the demand factor for marina load calculations of 45 shore power receptacles?**
   - A. 25%
   - B. 50%
   - C. 75%
   - D. 100%

8. **What is the minimum size for service lateral conductors supplying power to limited loads in a single branch circuit?**
   - A. 10 AWG copper
   - B. 8 AWG copper
   - C. 6 AWG copper
   - D. 4 AWG copper

9. **What is the voltage requirement for the electric vehicle supply equipment to function properly indoors?**
   - A. 120V
   - B. 220V
   - C. 240V
   - D. 480V

10. **What is the maximum insulation temperature rating for feeder and branch circuit conductors within 3 inches of a ballast?**
    - A. 70°C
    - B. 80°C
    - C. 90°C
    - D. 100°C

# Answers

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

# Explanations

## 1. Over a hot tub protected by GFCI, what is the required mounting height for light fixtures supported by EMT in NYC?

A. Less than 6 inches

B. At least 2 feet

C. At least 5 feet

D. Not allowed

**In New York City, when it comes to outdoor lighting around hot tubs, specific code requirements are established to ensure safety, particularly with regard to electrical hazards. Notably, the National Electrical Code (NEC), along with local amendments, imposes stringent safety provisions for installations in locations where moisture is prevalent, such as around hot tubs. Mounting light fixtures in close proximity to a hot tub can present risks associated with water exposure. Because of this, it's stipulated that light fixtures must not be mounted within certain distances of the water, specifically above hot tubs. The NEC indicates that fixtures intended for installation near wet or damp locations, like those near hot tubs, must not be installed in such a way that they could pose an electrical shock hazard. Given these regulations, installing light fixtures directly above or near a hot tub is not permitted for safety reasons. This underscores the need for ensuring that electrical installations around water bodies are conducted in a way that fully adheres to safety codes. Thus, light fixtures in this context are not only discouraged but outright disallowed within the specified zone above a hot tub, aligning with the aim of preventing any potential electrical hazards.**

## 2. Which device must not be connected to the lighting circuit in the elevator hoistway pit?

A. Light switch

B. Ground-fault circuit interrupter

C. Receptacle

D. Emergency light

**The device that must not be connected to the lighting circuit in the elevator hoistway pit is the ground-fault circuit interrupter (GFCI). While GFCIs are crucial in providing protection against electrical shock in wet or damp locations, in elevator pit applications, a GFCI is not specified for use in the lighting circuit primarily for safety and operational reasons. Elevator pits are classified as potentially hazardous areas due to water ingress and other environmental factors. The use of a GFCI in this context may introduce unnecessary risks. This is largely because GFCIs can trip under conditions that are typically not problematic for other types of devices, leading to situations where lighting could be lost in the pit area when it is most needed for maintenance or emergency situations. On the other hand, it is acceptable to have a light switch, receptacle, and emergency light in the elevator hoistway pit, as these devices can operate effectively without the complications that a GFCI may introduce in that particular environment.**

## 3. What is the minimum space required between the top of a switchboard and any combustible ceiling if the switchboard is not fully enclosed?

- A. 24 inches
- B. 30 inches
- C. 36 inches
- D. 42 inches

**The minimum space required between the top of a switchboard and any combustible ceiling, when the switchboard is not fully enclosed, is crucial for safety and compliance with the National Electrical Code (NEC) as well as local electrical codes, such as those enforced by the New York City Department of Buildings. A clear distance of 36 inches is established to prevent potential fire hazards. This clearance ensures that heat generated by the switchboard has sufficient room to dissipate without igniting any combustible materials, such as the ceiling above. The risk of combustion increases if equipment is too close to combustible surfaces, especially when considering that electrical components can generate heat during normal operation, particularly under heavy load. Maintaining this distance is not only essential for safety but also meets code requirements, ensuring that the installation is lawful and can withstand scrutiny during inspections. Thus, the 36-inch requirement acts as a preventive measure against fire hazards that could result from improper spacing and helps ensure the overall safety of the electrical installation.**

## 4. What is the appropriate amperage for fixed in-place X-ray equipment supplied through an attachment plug cap?

- A. 20 Amps
- B. 30 Amps
- C. 40 Amps
- D. 50 Amps

**The appropriate amperage for fixed in-place X-ray equipment supplied through an attachment plug cap is 30 Amps. This is established to ensure that the equipment has sufficient electrical supply to function safely and effectively, while also complying with the applicable safety codes and standards. In the context of X-ray equipment, which typically operates on higher voltages and requires a stable power supply for optimal performance, a 30 Amp rating provides a balance that ensures both operational reliability and safety. Exceeding this amperage could pose a safety risk and might lead to overheating or circuit failure, while an undersize rating may not support the operational requirements of the equipment. The choice of 30 Amps aligns with industry standards for the power requirements of such specialized equipment, which is critical in a healthcare setting where consistent, reliable operation is paramount. Understanding these standards helps ensure that electrical installations are carried out safely and in compliance with regulatory requirements.**

## 5. What happens if the voltage drop exceeds the maximum allowable percentage for a dwelling unit?

A. It still operates normally

B. It can damage the electrical equipment

C. It improves efficiency

D. It is considered safe

**When the voltage drop in a dwelling unit exceeds the maximum allowable percentage, it can adversely affect the performance and longevity of electrical equipment. Electrical devices are designed to operate within specific voltage ranges, and a significant drop can lead to insufficient power being supplied to the equipment. This can result in inefficient operation, potential overheating, or, in more severe cases, complete failure of the device. In many cases, prolonged exposure to undervoltage conditions can cause motors to overheat, reduce their lifespan, and lead to premature failure. Additionally, sensitive electronic devices may malfunction or experience data corruption as a result of inadequate voltage levels. Thus, maintaining voltage drop within acceptable limits is crucial for ensuring the functionality and safety of electrical systems in a dwelling.**

## 6. What is the minimum horizontal climbing space provided by conductors on poles, where power conductors are below communication conductors?

A. 24 inches

B. 30 inches

C. 36 inches

D. 48 inches

**The minimum horizontal climbing space provided by conductors on poles, when power conductors are installed below communication conductors, is indeed established at 30 inches. This distance is important for ensuring safe access and maintenance of the electrical and communication systems. The rationale behind the 30-inch requirement is to facilitate the safe movement of workers during installation and maintenance activities, reducing the risk of accidental contact with the energized power lines or equipment. This particular regulation is aligned with safety standards that aim to prevent accidents and enhance the safety of electrical infrastructure. In the context of utility safety regulations, maintaining sufficient horizontal clearance between different types of conductors allows for better maneuverability for technicians and helps to ensure that they can work effectively without the risk of entangling or accidentally coming into contact with energized parts. Understanding the specific clearance requirements is crucial for any electrician tasked with working on poles, as it ensures both compliance with safety regulations and protection for personnel.**

## 7. What is the demand factor for marina load calculations of 45 shore power receptacles?

**A. 25%**

**B. 50%**

**C. 75%**

**D. 100%**

**The demand factor for marina load calculations is typically determined based on the total number of shore power receptacles available and the expected usage. In this case, with 45 shore power receptacles, the demand factor is set at 50%. This value is derived from industry standards and practices that account for the fact that not all receptacles will be in use at the same time. For marinas, the 50% demand factor reflects the understanding that during peak times, it is reasonable to expect that only half of the total available receptacles will be actively drawing power simultaneously. This helps in calculating the overall load that needs to be managed and ensures that the electrical systems are adequately sized without being oversized for the actual anticipated demand. The choice of 50% for this particular situation allows for both safety in capacity management and economic efficiency in installation and operation, adhering to the principles established by the National Electrical Code (NEC) and local regulations. Understanding the rationale behind these demand factors is crucial for electrical design, especially in environments like marinas where variability in usage patterns is expected.**

## 8. What is the minimum size for service lateral conductors supplying power to limited loads in a single branch circuit?

**A. 10 AWG copper**

**B. 8 AWG copper**

**C. 6 AWG copper**

**D. 4 AWG copper**

**The minimum size for service lateral conductors supplying power to limited loads in a single branch circuit is determined by several factors, including the anticipated load and the ability of the conductors to safely carry current without overheating. In this case, the standard dictates that a minimum of 8 AWG copper conductor is suitable for handling these limited loads. This choice is based on the National Electrical Code (NEC) guidelines, which recommend 8 AWG copper conductors for certain applications and load requirements due to their capacity to handle the necessary ampacity without excessive voltage drop or overheating potential. It ensures safety and efficacy in power delivery, making 8 AWG copper not only a compliant choice but also a practical one for many residential and light commercial applications. Understanding these requirements is crucial for complying with local codes and ensuring the reliability of electrical systems while minimizing risks associated with inadequate conductor sizing.**

## 9. What is the voltage requirement for the electric vehicle supply equipment to function properly indoors?

- A. 120V
- B. 220V
- C. 240V
- D. 480V

**The voltage requirement for electric vehicle supply equipment (EVSE) to function properly indoors is 240V. This is the standard voltage level that meets the needs of most electric vehicle charging systems designed for residential and commercial applications. Using 240V allows for efficient charging of electric vehicles, enabling faster charging times compared to lower voltages such as 120V. This voltage is capable of supporting the power levels necessary for charging electric vehicles effectively, thus ensuring optimal performance and safety. While other voltage levels such as 120V may be available for basic charging needs, they typically result in considerably longer charging times and are not suitable for the faster charging requirements of most electric vehicles. Higher voltages like 480V are generally reserved for industrial applications and are not necessary or practical for residential indoor charging setups. Therefore, 240V is the appropriate choice for providing the necessary power to EVSE indoors.**

## 10. What is the maximum insulation temperature rating for feeder and branch circuit conductors within 3 inches of a ballast?

- A. 70°C
- B. 80°C
- C. 90°C
- D. 100°C

**The maximum insulation temperature rating for feeder and branch circuit conductors that are installed within proximity to a ballast is specified by the National Electrical Code (NEC). When conductors run near equipment that generates heat, such as ballasts for lighting fixtures, it's crucial to ensure that the insulation can withstand elevated temperatures. In this case, the correct rating for conductors placed within 3 inches of a ballast is 90°C. This temperature rating is designed to provide a higher threshold for heat exposure, thus ensuring the safe operation of the electrical system under conditions where heat is a factor. This means that conductors with a 90°C rating can operate safely in environments where ambient temperatures might be increased due to heat dissipation from the ballast. Conductors rated for lower temperatures, such as 70°C or 80°C, would not be appropriate in this situation because they would not be able to handle the increased temperature without the risk of insulation failure or degradation. The higher rating not only accommodates the potential rise in temperature due to the ballast but also ensures compliance with the NEC and enhances the overall safety and longevity of the electrical installation.**