PV Installation Test Prep

Free Practice Test — 30 Real Exam-Style Questions

with full answer key & explanations

Practice Questions

Try all 30 first, then check the answer key at the back.

1. According to OSHA requirements, at what height is fall protection required when installing rooftop PV systems?

A. 4 feet
B. 10 feet
C. 15 feet
D. 6 feet

2. What is the required minimum bending radius for PV source circuit conductors in conduit as per NEC 2017?

A. At least 12 times the diameter of the conductor
B. At least 3 times the diameter of the conductor
C. At least 8 times the diameter of the conductor
D. At least 5 times the diameter of the conductor

3. Which of the following is required when installing a roof-mounted PV array to maintain the fire classification of a roof?

A. Adding a layer of fire-retardant coating to the roof
B. Providing a minimum 3-foot wide clear access pathway from eave to ridge
C. Installing only bifacial modules
D. Using only aluminum racking

4. When installing a DC-coupled battery system with a PV array, what safety procedure is required before connecting the battery to the system?

A. Verifying that all breakers and disconnects are in the open position
B. Connecting the battery at night only
C. Shorting the battery terminals to verify capacity
D. Charging the battery to 100% before installation

5. Which of the following markings is required on PV system disconnecting means according to NEC 2017?

A. 'HIGH VOLTAGE'
B. 'SOLAR POWER'
C. 'WARNING: AUTHORIZED PERSONNEL ONLY'
D. 'PV SYSTEM DISCONNECT'

6. According to NFPA 70E, what is required for working on energized PV systems?

A. Only a certified electrician
B. Working exclusively during daylight hours
C. An energized electrical work permit
D. A standard building permit

7. When installing a ground-mounted PV array, what is the minimum burial depth required for direct burial conductors?

A. 18 inches
B. 24 inches
C. 12 inches
D. 36 inches

8. What is the correct method for bonding microinverters to the PV module racking system?

A. Using the manufacturer's specified hardware and torque specifications
B. Using any available metal screws
C. Using plastic zip ties
D. No bonding is necessary for microinverters

9. When installing a rapid shutdown system for a residential PV installation, at what distance from the array must voltage be reduced according to NEC 2017?

A. Within 3 feet of the array
B. Within 5 feet of the array
C. Within 10 feet of the array
D. Within 1 foot of the array

10. What is the maximum allowable temperature rating for conductors in a combiner box that can reach 60°C under normal operation?

A. 90°C
B. 105°C
C. 75°C
D. 60°C

11. Which of the following grounding methods is required for a PV array mounted on a metal roof?

A. Bonding to metal roof structure only
B. A grounding electrode conductor connected to the building's grounding electrode system
C. No grounding required due to metal roof contact
D. Isolated ground separate from building ground

12. What personal protective equipment (PPE) is required when working with batteries in a PV system installation?

A. Safety glasses, face shield, chemical-resistant gloves, and protective clothing
B. Only insulated gloves
C. Standard work gloves and a hard hat
D. No special PPE is required for battery work

13. When installing conduit for PV source circuits on a flat roof, what is the required support spacing for rigid metal conduit?

A. Every 3 feet
B. Every 15 feet
C. Every 6 feet
D. Every 10 feet

14. What is the correct procedure for installing PV modules in areas with high wind loads?

A. Always use ballasted mounting only
B. Install wind deflectors on all sides of the array
C. Use additional mounting points and follow racking manufacturer's high wind zone requirements
D. Install modules closer to the roof surface

15. According to NEC 2017, what is required for labeling a PV system disconnect?

A. Laminated labels attached with adhesive tape
B. Reflective, permanently attached signs with minimum 3/8-inch letters
C. Temporary paper signs
D. Any color sign with 1/4-inch letters

16. What is the proper torque specification range typically used for module-to-rail connections?

A. 10-15 ft-lbs, but always verify with manufacturer's documentation
B. As tight as possible with a hand tool
C. 25-30 ft-lbs for all connections
D. 5-8 ft-lbs for all module types

17. When installing a junction box for PV source circuits, what is the minimum working clearance required in front of the box according to NEC?

A. 1 foot
B. 5 feet
C. 18 inches
D. 3 feet

18. Which of the following is a proper method for installing conductors through a building's roof?

A. Routing through existing plumbing vents
B. Creating a penetration under roof overhangs without sealing
C. Using appropriate flashing and weatherproofing methods designed for electrical penetrations
D. Drilling a hole and sealing with standard caulk

19. What is required when installing microinverters or power optimizers in a PV system?

A. Connecting multiple optimizers to each module
B. Mapping serial numbers to their physical locations in the array
C. Installing them only on alternating modules
D. Positioning them only on the north side of modules

20. According to NFPA 70E, what should an installer do before working on a PV array that has been in operation?

A. Verify the array is de-energized using proper testing equipment
B. Wait until nighttime to ensure no generation
C. Cover modules with opaque material only
D. Disconnect only the AC side of the system

21. What is the most likely cause if a grid-tied PV system's production suddenly drops to zero while the sun is shining?

A. Normal cloud coverage
B. Nighttime operation mode
C. Automatic system maintenance cycle
D. Loss of utility power causing inverter anti-islanding shutdown

22. When conducting annual maintenance on a roof-mounted PV array, what should be the first safety procedure implemented?

A. Testing ground fault protection only
B. Checking inverter efficiency settings
C. Implementing proper lockout/tagout procedures
D. Washing modules immediately

23. Which monitoring data trend would most strongly indicate a need for module cleaning?

A. Inverter overtemperature alarms
B. Gradual decline in output over time with recovery after rainfall
C. Sudden complete system shutdown
D. Consistently low voltage readings at the combiner box

24. In a commercial PV system with string inverters, what is the appropriate first step when troubleshooting one underperforming inverter?

A. Check monitoring data and error codes for that specific inverter
B. Immediately replace the inverter
C. Rewire all strings connected to the inverter
D. Shut down the entire PV system

25. According to NFPA 70E, what personal protective equipment (PPE) is typically required when taking voltage measurements on an energized 480V AC combiner box?

A. Regular work clothes and rubber gloves
B. Hard hat only
C. Safety glasses and cotton gloves
D. Arc-rated clothing, insulated gloves with leather protectors, face shield with hard hat

26. Which of these measurements would most effectively verify proper operation of a maximum power point tracking (MPPT) function in an inverter?

A. Checking inverter fan operation
B. Testing AC frequency stability
C. Comparing actual power output to theoretical maximum based on irradiance and temperature
D. Measuring DC voltage only

27. A residential PV system shows 15% lower production than expected during winter months. What is the most likely cause?

A. Undersized conductors
B. Snow accumulation on modules
C. Inverter firmware corruption
D. Ground fault in module connections

28. When documenting corrective maintenance, which of the following must be included according to best practices?

A. Date/time of service, description of issue, corrective actions taken, and components replaced
B. Only the date of service
C. Only the components replaced
D. Only a signature from the technician

29. What is the appropriate action when discovering several modules with visible backsheet cracks during an annual inspection?

A. Ignore the cracks if the system is still producing power
B. Apply electrical tape to cover the cracks
C. Immediately disconnect only the affected modules
D. Document with photographs, record affected module serial numbers, and report to system owner

30. Which seasonal factor most significantly affects PV module cleaning frequency in agricultural areas?

A. Summer thunderstorm frequency
B. Spring pollen deposits
C. Harvest season dust accumulation
D. Winter snow removal needs

Answer Key & Explanations

1. D — 6 feet
OSHA requires fall protection for workers at heights of 6 feet or more in construction activities, which includes PV installation on rooftops.

2. C — At least 8 times the diameter of the conductor
NEC 2017 specifies that the minimum bending radius for PV source circuit conductors in conduit should be at least 8 times the diameter of the conductors to prevent damage to insulation.

3. B — Providing a minimum 3-foot wide clear access pathway from eave to ridge
To maintain a roof's fire classification, a minimum 3-foot wide clear access pathway from eave to ridge is required as per fire code requirements for PV installations.

4. A — Verifying that all breakers and disconnects are in the open position
Verifying that all breakers and disconnects are open is a critical safety procedure before connecting a battery to prevent unintended energization and potential electrical hazards.

5. D — 'PV SYSTEM DISCONNECT'
NEC 2017 requires that all PV system disconnecting means be permanently marked as 'PV SYSTEM DISCONNECT' for clear identification during maintenance or emergency situations.

6. C — An energized electrical work permit
NFPA 70E requires an energized electrical work permit when working on energized PV systems to ensure proper risk assessment and safety protocols are followed.

7. B — 24 inches
NEC requires a minimum burial depth of 24 inches for direct burial conductors to protect them from physical damage and meet code compliance.

8. A — Using the manufacturer's specified hardware and torque specifications
Using the manufacturer's specified hardware and torque specifications ensures proper bonding of microinverters to the racking system, maintaining electrical continuity and safety.

9. D — Within 1 foot of the array
NEC 2017 requires that PV system conductors more than 1 foot from the array must be reduced to 30V or less within 30 seconds during rapid shutdown.

10. C — 75°C
Conductors used in a combiner box that can reach 60°C should have a temperature rating of at least 75°C to ensure safe operation and prevent insulation degradation.

11. B — A grounding electrode conductor connected to the building's grounding electrode system
A grounding electrode conductor connected to the building's grounding electrode system is required for PV arrays on metal roofs to ensure proper grounding and safety.

12. A — Safety glasses, face shield, chemical-resistant gloves, and protective clothing
Safety glasses, face shield, chemical-resistant gloves, and protective clothing are required PPE when working with batteries to protect against chemical exposure and electrical hazards.

13. D — Every 10 feet
Rigid metal conduit requires support at intervals not exceeding 10 feet as specified by NEC to prevent sagging and maintain structural integrity.

14. C — Use additional mounting points and follow racking manufacturer's high wind zone requirements
Using additional mounting points and following the racking manufacturer's high wind zone requirements ensures secure installation in high wind areas and prevents module damage.

15. B — Reflective, permanently attached signs with minimum 3/8-inch letters
NEC 2017 requires that PV system disconnects be labeled with reflective, permanently attached signs with minimum 3/8-inch letters for visibility and durability.

16. A — 10-15 ft-lbs, but always verify with manufacturer's documentation
Module-to-rail connections typically require 10-15 ft-lbs of torque, but the exact specification should always be verified with the manufacturer's documentation to ensure proper installation.

17. D — 3 feet
NEC requires a minimum working clearance of 3 feet in front of junction boxes to provide adequate space for safe access and maintenance.

18. C — Using appropriate flashing and weatherproofing methods designed for electrical penetrations
Using appropriate flashing and weatherproofing methods designed for electrical penetrations ensures a watertight seal and maintains the building's weather resistance.

19. B — Mapping serial numbers to their physical locations in the array
Mapping serial numbers to physical locations is essential when installing microinverters or power optimizers for proper system monitoring and troubleshooting.

20. A — Verify the array is de-energized using proper testing equipment
NFPA 70E requires verification that the array is de-energized using proper testing equipment before beginning work to ensure worker safety from electrical hazards.

21. D — Loss of utility power causing inverter anti-islanding shutdown
A complete loss of production during sunny conditions in a grid-tied system typically indicates utility power loss. Most grid-tied inverters are required to shut down during utility outages for safety reasons (anti-islanding protection).

22. C — Implementing proper lockout/tagout procedures
Before any maintenance work begins, the system should be de-energized following lockout/tagout procedures to ensure worker safety, which is a critical OSHA requirement for electrical work.

23. B — Gradual decline in output over time with recovery after rainfall
A gradual decline in system output over time with immediate recovery after rainfall is a classic indication of soiling (dirt accumulation) on modules, which can be remedied by cleaning.

24. A — Check monitoring data and error codes for that specific inverter
Before making any physical changes or repairs, checking monitoring data and error codes is the most efficient first step to diagnose the specific issue with the underperforming inverter.

25. D — Arc-rated clothing, insulated gloves with leather protectors, face shield with hard hat
Working on energized 480V equipment requires appropriate PPE including arc-rated clothing, insulated gloves with leather protectors, and face shield with hard hat to protect against potential arc flash hazards.

26. C — Comparing actual power output to theoretical maximum based on irradiance and temperature
Comparing actual power output to theoretical maximum based on irradiance and temperature is the most effective way to verify MPPT functionality, as it shows whether the inverter is optimizing power extraction from the array.

27. B — Snow accumulation on modules
Snow accumulation is the most likely cause of reduced production in winter months, as it physically blocks sunlight from reaching the modules, unlike the other options which would affect performance year-round.

28. A — Date/time of service, description of issue, corrective actions taken, and components replaced
Proper documentation requires all key elements: date/time of service, description of issue found, actions taken to resolve it, and components replaced (if any). This comprehensive documentation ensures proper record-keeping for warranty and future maintenance.

29. D — Document with photographs, record affected module serial numbers, and report to system owner
Backsheet cracks can lead to moisture ingress and safety hazards. Documenting with photographs, recording module serial numbers, and reporting to the system owner allows for proper warranty claims and replacement planning.

30. C — Harvest season dust accumulation
In agricultural areas, harvest seasons often create significant dust that accumulates on modules, requiring more frequent cleaning to maintain optimal performance. Other options don't typically follow seasonal patterns that correlate with agricultural activities.

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