Solar PV Design Exam 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. When reviewing local authority having jurisdiction (AHJ) requirements for a commercial PV installation, which of the following would typically be the MOST important to consider first?

A. Landscaping regulations
B. Color preferences for equipment
C. Marketing restrictions
D. Setback requirements from the building code

2. Which section of the 2017 NEC specifically addresses solar photovoltaic systems?

A. Article 705
B. Article 250
C. Article 690
D. Article 480

3. When reviewing utility interconnection requirements, which of the following is typically required for grid-connected PV systems?

A. Cellular data monitoring
B. External disconnect switch
C. Battery backup for all systems
D. Manual reset button

4. A homeowners association (HOA) covenant restricts roof-mounted solar equipment visibility from the street. Which design approach would best address this requirement?

A. Place the array on the rear-facing roof slope
B. Install a larger system to increase efficiency
C. Use only ground-mounted arrays
D. Increase inverter size to compensate

5. According to the 2017 NEC, what is the required minimum clear space in front of electrical equipment operating at 600V or less?

A. 72 inches
B. 24 inches
C. 48 inches
D. 36 inches

6. When reviewing project criteria for a new PV installation, which document would contain the specific structural requirements for roof loading?

A. Landscaping plan
B. Electrical service agreement
C. Structural engineering report
D. Marketing brochure

7. When evaluating utility requirements for a grid-connected PV system, which of the following limitations would MOST directly affect system size?

A. Transformer color
B. Net metering capacity limits
C. Utility billing cycle
D. Customer service hours

8. Which of the following best describes a key purpose of reviewing construction specification documents during PV system design?

A. To identify required materials and installation methods
B. To determine property resale value
C. To calculate utility rebates
D. To set marketing strategies

9. In accordance with the 2017 NEC, what is the minimum distance required between a PV array and the roof ridge to allow for firefighter access?

A. 24 inches
B. 18 inches
C. 48 inches
D. 36 inches

10. When reviewing local zoning ordinances for a ground-mounted PV array, which of the following would typically be MOST restrictive?

A. Manufacturer country of origin
B. Cable color requirements
C. Height limitations
D. Monitoring system interface

11. According to most electric service providers, which of the following is typically required before a PV system can be interconnected to the grid?

A. Social media promotion
B. Signed interconnection agreement
C. Customer credit score check
D. Marketing plan approval

12. When reviewing the construction plan set for a new commercial building with planned PV, which drawing would contain information about the existing electrical service capacity?

A. Electrical site plan
B. Landscaping blueprint
C. Interior design layout
D. Marketing floor plan

13. Which type of document would specify the wind and snow load ratings that a roof-mounted PV system must be designed to withstand?

A. Equipment color chart
B. Marketing agreement
C. Utility bill format
D. Structural engineering specifications

14. According to the 2017 NEC, what is required for PV systems on buildings with rapid shutdown?

A. Cellular communication backup
B. Manual reset capability only
C. Conductors limited to no more than 30 volts within 30 seconds
D. Redundant power supplies

15. When reviewing project criteria for a proposed PV system, which document would contain the requirements for fire department access pathways on the roof?

A. Utility rate schedule
B. Local fire code
C. Marketing guidelines
D. Equipment warranty

16. Which of the following utility requirements would MOST directly affect the electrical configuration of a grid-tied PV system?

A. Power factor requirements
B. Billing cycle timing
C. Customer service availability
D. Utility company logo placement

17. When reviewing covenants for a residential PV installation, which restriction would MOST impact the system's energy production capability?

A. Brand selection criteria
B. Equipment color requirements
C. Installer dress code
D. Restrictions on module orientation

18. According to the 2017 NEC, ground-mounted PV array fences must be at least how far from the array?

A. 60 inches
B. 24 inches
C. 36 inches
D. 12 inches

19. When reviewing electric service provider requirements, which of the following would typically be needed for systems larger than 10kW?

A. Homeowner's signature only
B. Professional engineer's stamp on interconnection plans
C. Marketing approval
D. Social media announcement

20. Which construction document would provide information about the existing electrical panel's bus bar rating?

A. Electrical single-line diagram
B. Architectural elevation
C. Landscape plan
D. Marketing floor plan

21. Which of the following is most important to document when conducting a preliminary site assessment for a roof-mounted PV array?

A. Building occupancy hours
B. Interior wall paint color
C. Landscape irrigation schedule
D. Roof age, condition, and material

22. When assessing a potential ground mount location, which soil characteristic is most important to document?

A. Surface vegetation species
B. Soil color
C. Soil composition and stability
D. Historical crop yields

23. What tool is most commonly used to conduct a comprehensive shading analysis of a proposed PV array location?

A. Tape measure
B. Solar pathfinder or solar access measurement tool
C. pH meter
D. Moisture sensor

24. When assessing roof load capacity for a PV installation, which of the following represents a dead load?

A. Weight of PV modules and racking system
B. Wind uplift forces
C. Snow accumulation
D. Maintenance personnel weight

25. What is the primary concern when assessing the viability of a flat roof membrane for PV installation?

A. Original installation contractor information
B. Color of the membrane material
C. Manufacturer of the roofing material
D. Age, condition, and warranty status of the membrane

26. Which of the following site hazards should be documented during a site assessment for a ground-mounted PV array?

A. Local wildlife species
B. Bird migration patterns
C. Underground utilities and service lines
D. Historical precipitation data

27. When using a solar pathfinder for shading analysis, what time period is most critical to analyze for maximum PV production in the northern hemisphere?

A. 6:00 AM to 8:00 AM
B. 9:00 AM to 3:00 PM
C. 4:00 PM to 6:00 PM
D. 11:00 PM to 5:00 AM

28. Which tool would be most appropriate for determining the slope of a roof during a site assessment?

A. Inclinometer or digital level
B. Tape measure
C. Compass
D. Barometer

29. When assessing equipment locations for a residential PV system, which of the following is a primary consideration for inverter placement?

A. Alignment with decorative landscaping
B. Color coordination with building exterior
C. Proximity to household pets
D. Accessibility for maintenance and service

30. What information about nearby trees should be documented during a site assessment for long-term shading analysis?

A. Root system depth
B. Leaf color and seasonal changes
C. Species, height, and maturity level
D. Historical pruning schedule

Answer Key & Explanations

1. D — Setback requirements from the building code
Setback requirements from the building code are crucial to consider early in the design phase as they directly impact where PV equipment can be placed and may significantly constrain system size and configuration.

2. C — Article 690
Article 690 of the National Electrical Code (NEC) is dedicated specifically to solar photovoltaic systems and contains the requirements for installation, operation, and maintenance of these systems.

3. B — External disconnect switch
An external disconnect switch is typically required by utilities to allow them to isolate the PV system from the grid during maintenance or emergency situations.

4. A — Place the array on the rear-facing roof slope
Placing the array on the rear-facing roof slope would typically make it less visible from the street, helping comply with HOA visibility restrictions while still allowing for solar installation.

5. D — 36 inches
NEC 110.26(A)(1) requires a minimum working space of 3 feet (36 inches) in front of electrical equipment operating at 600V or less to ensure safe access for installation and maintenance.

6. C — Structural engineering report
Structural engineering reports contain the analysis of roof loading capacity, which is critical for determining if the roof can support the additional weight of a PV system.

7. B — Net metering capacity limits
Net metering capacity limits directly restrict the maximum size of a grid-connected PV system that can participate in net metering programs, which affects system sizing decisions.

8. A — To identify required materials and installation methods
Construction specification documents provide detailed requirements for materials and installation methods that must be followed for a project to be considered compliant, ensuring the PV system meets all required standards.

9. D — 36 inches
NEC 690.12(D) requires at least 3 feet (36 inches) of clear space between a PV array and the roof ridge to allow firefighter access and ventilation in case of emergency.

10. C — Height limitations
Height limitations in zoning ordinances often present the most restrictive challenge for ground-mounted PV arrays, as they directly limit the tilt angle and overall design of the system.

11. B — Signed interconnection agreement
An interconnection agreement is a legal contract between the customer and the utility that must be executed

before a PV system can be connected to the grid, outlining terms, conditions, and responsibilities.

12. A — Electrical site plan
Electrical site plans typically show the existing electrical service capacity, including service entrance, main panel location, and capacity information that is critical for PV integration planning.

13. D — Structural engineering specifications
Structural engineering specifications detail the required wind and snow load ratings that any rooftop equipment, including PV systems, must be designed to withstand based on local conditions and building codes.

14. C — Conductors limited to no more than 30 volts within 30 seconds
NEC 690.12 requires that conductors be limited to no more than 30 volts within 30 seconds of rapid shutdown initiation, providing safety for first responders in emergency situations.

15. B — Local fire code
Local fire codes specify requirements for access pathways on roofs with PV systems to ensure firefighters have safe access routes for emergency operations.

16. A — Power factor requirements
Power factor requirements directly affect the electrical configuration of the system, as they dictate how the inverter must be programmed to deliver power at a specific power factor to maintain grid stability.

17. D — Restrictions on module orientation
Restrictions on module orientation can significantly impact energy production as they may prevent optimal positioning of panels to capture maximum sunlight, potentially reducing system output substantially.

18. C — 36 inches
NEC 110.31 requires a minimum distance of 3 feet (36 inches) between ground-mounted PV arrays and fences to allow adequate working space for maintenance and service.

19. B — Professional engineer's stamp on interconnection plans
Systems larger than 10kW typically require a professional engineer's stamp on interconnection plans to verify that the system meets all utility and code requirements, ensuring safe and proper grid connection.

20. A — Electrical single-line diagram
Electrical single-line diagrams show the electrical distribution system including panel bus bar ratings, which are critical for determining available capacity for PV interconnection.

21. D — Roof age, condition, and material
Roof age, condition and material are critical factors that determine if a roof is suitable for a PV installation and how long it might last in relation to the expected lifespan of the PV system.

22. C — Soil composition and stability
Soil composition affects foundation design and stability for ground-mounted systems, determining what type of foundation is appropriate and what engineering considerations are needed.

23. B — Solar pathfinder or solar access measurement tool
Solar pathfinders or solar access measurement tools are specifically designed to evaluate shading throughout the year by mapping the sun's path across the sky and identifying obstructions.

24. A — Weight of PV modules and racking system
Dead loads are permanent, constant loads on a structure. The weight of the PV modules and racking system is considered a dead load because it's permanently attached to the roof.

25. D — Age, condition, and warranty status of the membrane
The age, condition, and warranty status of the membrane are critical because installing PV on a roof that will need replacement soon is problematic and could void existing warranties.

26. C — Underground utilities and service lines
Underground utilities pose significant safety risks during construction and foundation work for ground-mounted systems. Identifying these hazards before construction begins is essential for safety planning.

27. B — 9:00 AM to 3:00 PM
9:00 AM to 3:00 PM represents the period of highest solar intensity and potential production, making it the most critical period to be shade-free for maximum system performance.

28. A — Inclinometer or digital level
An inclinometer or digital level is specifically designed to measure angles and slopes, making it the most appropriate tool for determining roof pitch accurately.

29. D — Accessibility for maintenance and service
Accessibility for maintenance and service is critical for inverter placement to ensure that the equipment can be easily accessed for repairs and routine maintenance throughout its lifetime.

30. C — Species, height, and maturity level
Species, height, and maturity are important because they help predict future shading impacts as trees grow taller and wider, potentially affecting system performance over time.

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