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Continuing Education Course #498  
National Electric Code: Solar Power

1. What area of jurisdiction most aptly describes that of the National Electrical Code (NEC)?
  - a. Generation Stations
  - b. End User Buildings
  - c. Transmission Lines
  - d. Transmission Substations
  
2. Which type of unit conversion ensures a part is interchangeable?
  - a. English to Metric
  - b. Hard Conversion
  - c. Metric to English
  - d. Soft Conversion
  
3. Which chapter(s) is(are) stand-alone and not modified by the other chapter(s)?
  - a. Chapters 1-4
  - b. Chapter 5-6
  - c. Chapter 7
  - d. Chapter 8
  
4. What type of circuit conductor are from the final overcurrent device and the outlet?
  - a. Branch
  - b. Feeder
  - c. Main Feeder
  - d. Subfeeder
  
5. What is the Code name for what a layman often calls the "safety ground" or "green ground"?
  - a. Equipment Grounding Conductor
  - b. Grounding Electrode Conductor
  - c. Ground Electrode
  - d. Neutral
  
6. A wire with black insulation has three grey stripes on it. What type of wire is this meant to be?
  - a. Ground
  - b. Hot
  - c. Neutral
  - d. Phase C
  
7. The wire that connects the neutral bus to earth ground is called the \_\_\_\_\_?
  - a. Equipment Safety Ground
  - b. Grounding Electrode Conductor

- c. Grounding Electrode Jumper
  - d. Neutral Bonding Jumper
8. Island Mode of operation using isolated microgrids differ from interconnected microgrids in their use of \_\_\_\_\_?
- a. Diesel Generators
  - b. Disconnecting Means
  - c. Solar Arrays
  - d. Stand-Alone Power Production
9. What approximate voltage is produced by solar cell made of silicon?
- a. 0.5
  - b. 1.2
  - c. 2.0
  - d. 3.7
10. What NEC annex provides examples of ampacity calculations?
- a. Annex A
  - b. Annex B
  - c. Annex C
  - d. Annex E
11. Energy gaps form when the atomic spacing \_\_\_\_\_.
- a. Decreases
  - b. Increases
  - c. Is Disturbed by Electric Forces
  - d. Is Disturbed by Magnetic Forces
12. Light at a wavelength of 600 nm oscillates at what frequency in hertz?
- a.  $200 \times 10^{12}$
  - b.  $500 \times 10^{12}$
  - c.  $600 \times 10^{14}$
  - d.  $700 \times 10^{14}$
13. In what region of a pn junction is light absorbed releasing electrons into the circuit?
- a. n doped region
  - b. p doped region
  - c. space charge region
  - d. surface region
14. What is the approximate silicon solar cell efficiency?
- a. 5 %
  - b. 10 %
  - c. 20%
  - d. 50%
15. A silicon solar module designed for a 12 V system has an open circuit voltage of 21 V maximum. Six of the modules are to be used in series. The system is to be utilized where the ambient temperature is expected to be 75°F.
- What is the maximum voltages to use for design purposes?
- a. 12 V
  - b. 21 V

- c. 126 V
- d. 128 V

16. What is the point where the maximum current must be determined by an industry standard method by a licensed professional engineer?

- a. 10 kW
- b. 100 kW
- c. 125 kW
- d. 1000 kW

17. When multiple parallel PV strings are protected by a single overcurrent device, the conductors are sized for the following.

- a. 3 Hour Local Noon Rate
- b. Overcurrent Device Rating
- c. Sum of Short-Circuit Current Ratings x 125%
- d. Sum of B and C

18. What is the air mass coefficient for the following conditions?

Distance to Zenith: 9 km

Distance of Effective Light Path through Atmosphere: 11 km

- a. 0.2
- b. 0.8
- c. 1.0
- d. 1.2

19. What is the air mass coefficient if the solar panels are tilted 35° from local zenith?

- a. 0.2
- b. 0.8
- c. 1.0
- d. 1.2

20. A PV system installed on a building requires arc-fault circuit protection if the voltage is \_\_\_\_ V or greater.

- a. 30
- b. 50
- c. 80
- d. 115

21. Controlled conductors inside an array boundary must be less than what voltage in what timeframe following shutdown initiation?

- a. <30 V in 30 s
- b. <80 V in 30 s
- c. <30 V in 80 s
- d. <80 V in 3 s

22. An XLPE cable rated for 125°C and sized at 10 gauge is to be used for a home solar system. The ambient temperature can be as high as 110°F.

What is the ampacity of this conductor for the situation as described?

- a. 41 A
- b. 42 A

- c. 44 A
- d. 46 A

23. PV system cables that conduct AC are to be grouped together by cable ties at no more than every \_\_\_\_\_?

- a. 1.6 ft
- b. 2.0 ft
- c. 4.0 ft
- d. 6.0 ft

24. What is the voltage requirement for including a Ground-Fault Detector-Interrupter in a PV system?

- a. >30 V AC
- b. >30 V DC
- c. >80 V AC
- d. >80 V DC

25. Requirements for independent microgrid systems and interconnected systems in island mode can be found in the parallel systems requirements of what portion of the Code?

- a. Annex B
- b. Article 690
- c. Article 691
- d. Article 705

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