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Continuing Education Course #202
Solar Power Part III
Design Considerations

1. A typical solar system is comprised of what 6 basic components?
- a. solar panels, low voltage disconnect, batteries, inverter, monitor, and wiring.
- b. solar panels, charge controller, batteries, generator, monitor, and wiring.
- c. solar panels, charge controller, batteries, inverter, monitor, and wiring.
- d. solar panels, charge controller, batteries, inverter, monitor, and grid-tie.

2. Most PV systems will use _____ panels?
- a. Amorphous
- b. Polycrystalline
- c. Monocrystalline
- d. None of the above

3. Rarely will you choose a Charge Controller without _____ capability?
- a. Maximum Power Point Tracking (MPPT)
- b. Pulse Width Modulation (PWM)
- c. Pure Sine Wave
- d. None of the above

4. The purpose of the inverter is to _____?
- a. To reverse the polarity of the batteries
- b. Convert the electricity into 3-phase power
- c. Convert the DC volts into AC volts
- d. None of the above.

5. The monitor meter is used to _____?
- a. Monitor the condition of the batteries
- b. Help locate the source of any system problems
- c. More efficiently use a generator when charging the batteries
- d. All of the above

6. An on-grid system is what?
- a. A system without a connection to a standard electrical service provided by a power company.
- b. Allows you to use electricity from the power company or the PV system
- c. Uses electricity only from the power company
- d. All of the above

7. When you design a solar system, you must account for every demand the end user has for power.
- a. True
- b. False

8. When the temperature decreases, solar efficiency does what?
- a. Decreases
- b. Increases
- c. Fluctuates
- d. No change

9. For adjustable panel mounts during the winter months, the angle of inclination should do what?
- a. Decrease
- b. Increase
- c. Not change
- d. None of the above

10. A two-axis tracking solar panel mount can do what?
- a. Track the sun's movement east to west
- b. Automatically adjust for the sun's seasonal inclination
- c. Boost panel output by 20-30%
- d. All of the above

11. For an installation in the Northwest at a latitude of 45° N with an average of 3.5 hours of useable sunlight per day and consisting of ten 230 watt solar panels, how many watt-hrs will the system produce?
- a. 5450
- b. 6350
- c. 8050
- d. 9875

12. A system design calculates a need for 7,680 watt-hours per day, receives 4 hours of useable sunlight daily, and you calculate a demand of 1920 watts per hour. How many solar panels do you need?
- a. Twelve 150-watt panels
- b. Nine 200-watt panels
- c. Eight 250-watt panels
- d. Six 300-watt panels

13. What voltage would be selected to use the smallest wire diameter?
- a. 6V
- b. 12V
- c. 24V
- d. 48V

14. A system is designed for 6,000 watt-hrs per day and you want to provide for 3 days of backup, how many watt-hrs does your battery bank need to be sized for?
- a. 14,000
- b. 16,500
- c. 18,000
- d. 20,500

15. What is the easiest way to identify a flooded cell battery?
- a. The size of the battery posts.
- b. The letters FLD stamped on the cover.
- c. The battery caps for maintenance.
- d. None of the above

16. How many 12-volt 110 amp-hr batteries will you need for an 11,880 watt-hr 24-volt system?
- a. 7
- b. 8
- c. 10
- d. 12

17. The primary purpose of the charge controller is _____?
- a. To maintain the proper charging voltage on the batteries.
- b. To minimize the charge voltage on the batteries.
- c. To minimize the charge rate to the batteries.
- d. To maintain a constant charge rate to the batteries.

18. Of the three types of inverters, which produces the best power?
- a. True Sine Wave
- b. Modified Sine Wave
- c. Square Sine Wave

19. True or False: All utility providers are required to allow interconnection of a solar system.
- a. True
- b. False

20. When selecting an inverter, you must select one that has the same nominal voltage as your battery bank.
- a. True
- b. False

21. What should be the maximum voltage drop allowed when sizing wire from the solar panels to the charge controller?
- a. 1%
- b. 2%
- c. 5%
- d. 10%

22. Which statement is true for batteries and solar panels wired in series?
- a. Current stays the same.
- b. Current doubles.
- c. Voltage stays the same.
- d. None of the above.

23. Two different battery models are available. One is a 105 amp-hr 20-hr rating and the other is a 110 amp-hr 100-hr rating. Which is preferred for use in your system?
- a. The 20-hour rating
- b. The 100-hour rating

24. True or False: You should not replace an old battery in a bank of batteries with a new battery.
- a. True
- b. False

25. True or False: If you only need DC power when the sun is shining, there is no need of a charge controller.
- a. True
- b. False