PV Study Items of Importance

What you should know:

1. environmental conditions that could reduce array performance: (clouds, rain, fog, snow, adjacent trees, etc.)
2. site specific conditions that could reduce performance
   (adjacent to farm fields, dirt roads, an airport, industrial zone, construction site, dusty area, bird droppings on the array, etc.)
3. reflective conditions that could increase performance
   - cloud enhancement, snow/ ice reflection, nearby high rise with mirror class which intensifies sun light.
4. array design must take into account external loads
   - wind loads
   - rain
   - snow
   - seismic

5. calculating percentage of use/ output/ etc. (basic math problems)

6. What is GFI? And where is it located in the system? What does it protect?

7. Why is a GFI fuse only 1 amp in most cases?

8. Lightning arrestor handle what type of surge
   a. Voltage b. Amperage c. Watts d. Resistance

9. Charge controller function?

10. When are charge controllers required?

11. Where are charge controllers used?

12. Transformers: types, functions/ purposes of

13. Where are transformers found in PV systems?

14. What is MPP ?

15 MPPT ?

16. Can you read a sun chart? (better practice now!) A pathfinder chart?

17. If one cells output under full sun is 1.34 volts, what would 36 cells wired in series in a module produce? (consider no derations)

18. Know definitions (and/or uses) of the following

Inverter
Combiner box
Junction box
DC disconnect
AC disconnect
Performance meter
Net-meter
Grounding electrode
Over current protection
Charge controller
Shunt
Rectifier

19. The consideration of temperature in regards to over current protection

20. IN a PV systems, Heat effects what the most ? Volts or Amps?

21. Difference between equipment and system grounding

22. Ground conductor in a standard PV system (not Sun Power)

23. Color code

24. What is article 690?

25. Safety concerns. Ladder, lifting and carrying, power tools, etc.

26. Safety harnesses required when?

27. Considerations of multi zone systems (modules on different roof faces, orientations/ tilts.)

28. Advantages of different types of mounting options?

29. Ground mount advantages and disadvantages

30. Are manufactures specifications important? Why?

31. types of approved roof sealant for penetrations

32. How is the inverter matched to the array? (parameters/ considerations)

33. Know these terms and concepts

Current
Power
Conductors
Insulators
Semiconductors
Ohms
Series circuit
Parallel circuits
Source circuit
Load circuit
Electromotive force
STC
PTC
PVUSA
AHJ
BOS
kWh
MW
Watt hours
Irradiance - measure of what?
Irradiation
Insolation
PV-Watts
NREL
DOE
USE-2
PV Wire
THHN
THWN
AWG
Maximum power point
Battery bank
Solar Path Finder
Sol Metric Suneye

Solstice - summer/ winter
Equinox - spring/ fall
Azimuth
Altitude
Elevation
Zenith angle
Fixed tilt, adjustable tile, horizontal and dual axis trackers - advantages or each
Hard shadows
Diffuse shading
Deration
Derate factors
Solar constant
Peak sun hours
Watts per square meter
Efficiency of an inverter, various modules, and BOS components
Features of a modern inverter
- MPPT
- anti islanding
- power conditioning unit
- converts DC to AC
- remote monitoring
- performance metering
- GFI

Integrated inverters have disconnects & combiners built in

> Row spacing (flat roof shading issues)

> Battery based system terminology and equipment
- be prepared to break down a question on a stand alone system

> Types of installations

> Types of PV

> Photovoltaic Effect