ET142 Day One **Name _____**

Matching

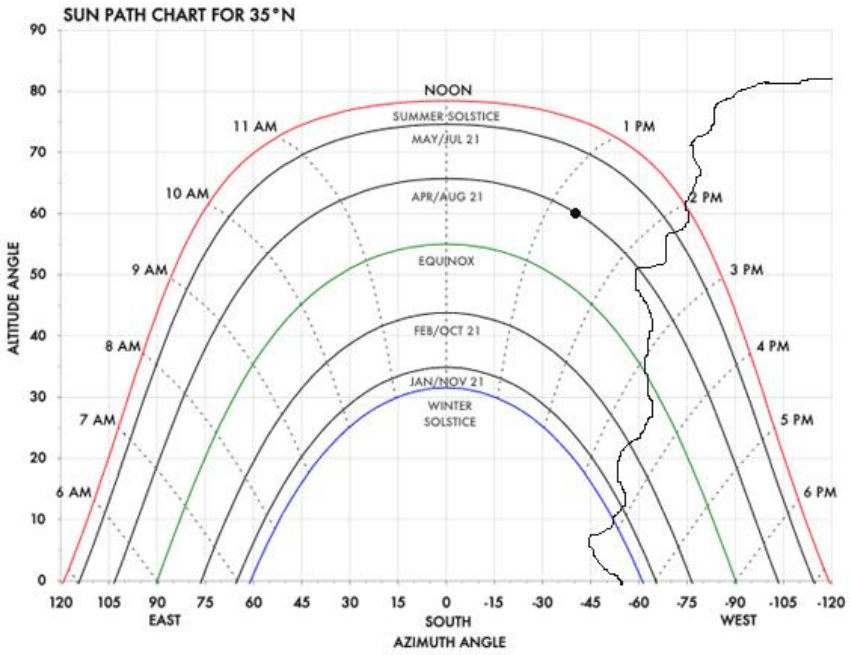
a. Insolation
b. Irradiance
c. Irradiation
d. Specific Gravity
e. H Bridge
f. Soltice
g. Equalization
h. Discharge rate
i. Galvanic corrosion
j. Islanding
k. Ground fault circuit interrupter
l. Equinox
m. Electrolyte
n. Allowable depth of discharge
o. Ground Fault
p. Push Pull

____ 1. The average battery bank total operating time over the period of autonomy.
____ 2. The solar energy that reaches the earth's surface over a 24 hour period.
____ 3. The intensity of solar power over a period of time
____ 4. Undesirable condition where an interactive inverter continues to osupply power to the utility grid during a utility outage.
____ 5. The earth's orbital position whtne the solar declination is at its maximum or minimum
____ 6. The undesirable condition of current flowing through the grounding conductor.
____ 7. A controlled overcharge for a few hours
____ 8. The ratio of the density of a substance to the density of water.
____ 9. An electrochemical process that causes electrical current to flow between two dissimilar metals, eventually corroding one of the materials.
____ 10. Inverter circuit type that switches DC input into square wave AC output by using two pairs of switching devices.

Problem

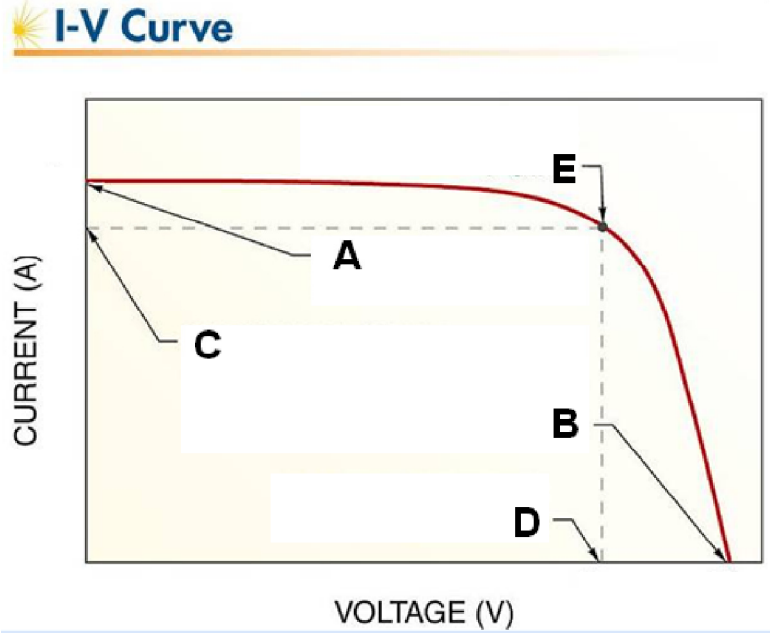
11. _____ converts AC power to DC power and _____ converts DC power to AC power
12. Phase unbalance when three-phase power lines are more or less than _____ out of phase.
13. Planet A is 2AU from the sun and Planet B is 6AU from the sun. The irradiance at Planet A is 300W/m2. Use the Inverse Square Law to calculate the irradiance at Planet B
14. A fully charged,12V, 100A-h battery is supplying power to a 60W light bulb.How long can the battery keep supplying power before reaching a depth of discharge of 50%?
15. At approximately what time in the afternoon will the sun be shaded by the obstruction on October 21? (Use the attached sun path chart on the next page)
16. An electric space heater draws 1550 watts. If the heater is run continuously for 3 weeks, and your electricity rate is $0.175/kWh, how much does it cost to run the heater?

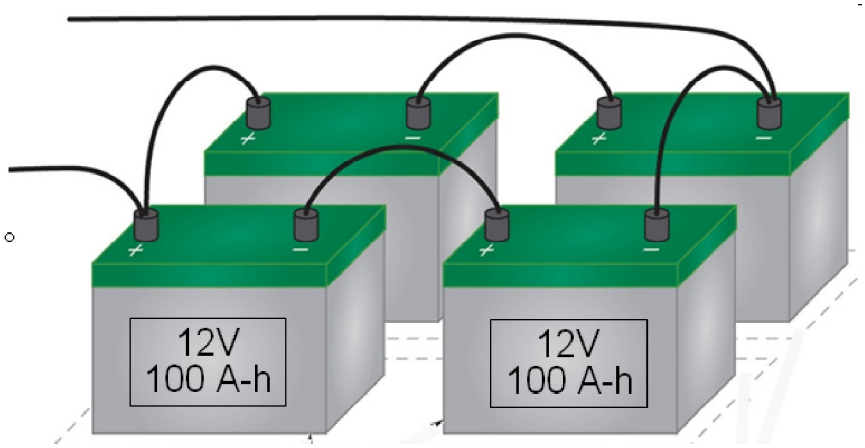
17.



What does the the dot show in the sun path chart above?

18. Correctly label all the points on the IV curve:



19. 

What is the output voltage and output current of the battery configuration above? Assume all batteries have the same voltage and capacity.

20. You wish to size a PV array using the following parameters:

Average daily consumption = **28.0kWh(AC)/day**
Average peak sun hours = **5.6h/day**

Derating Factors	**Input Values**
PV module nameplate DC rating	95.0%
Tilt Factor / Orientation Adjusatment	90.0%
Inverter	95.0%
Mismatch	99.0%
Diodes and connections	99.5%
DC wiring	99.0%
AC wiring	99.0%
Soiling	97.5%
System availabilty	98.0%
Shading	97.5%
Sun-tracking	97.0%
Age	100.0%
Overall DC to AC derate factor	???

a) What is the **nominal AC system** size required to generate 100% of the averge daily consumption? (ignore derating factors)

b) What is the overall derating factor using the table above?

c) What is the required **installed PV Array DC system** to generate 70% of the average daily consumption using the calculated overall derating factor?