

Big Exam #3: PHYS 320

In Midterms, you are allowed a calculator and notes with 50 bits of information. However, in this big exam, please work out your answers without a calculator. I will be looking for proper canceling of units. Precision is not important.

1) Transmission

Why do we need alternating current?

- a) Why do we transport electricity via super high voltage?
- b) What role do transformers play in the transmission process?.
- c) Do we still need AC today? If so why? If not, what could replace it and why do we still have it today?
...problems with present HV grid?
...alternatives?
...how might cheap solar come into play?

2. Your house is grid connected with nothing plugged into the sockets!

a) what is the voltage to your house?

b) What current is the current to your house?

Then you plug in a heater that draws 10 A.

a) What is the voltage to your house?

b) What current is your house drawing?

c) What's the power of the heater?

Then you plug in three more heaters, so you have a total of 4 heaters!

a) What's the voltage to your house?

b) What current is your house drawing?

c) What is the power your house is being charged for?

3. I left a 1000W heater in my daughter's room on overnight: 10 hours! It was warm in the morning!

a) how much energy did I use up?

b) What did it cost me financially?

c) How much CO₂ did it put in the air? You'll have to think about how we generate marginal electricity in Cal!

Name _____