EE180J: Homework#2:
Spring 2016
100 points total (20 pts/problem)

Due April 20.

1. Calculate the efficiency of a system where the useable output power is 10kW and the input power drawn is 2A at 10kV.

2. What is the difference between heat and temperature?

3. Calculate the thermal power transferred through an aluminum bar that is 25 square cm in cross section and 30 cm long when the temperature at the hot end is 100 ^{o}C and the temperature at the cold end is 20 ^{o}C.

4. Consider an automobile powered by PV panels on its roof. Assuming the panels are 20% efficient, compare the power available for such a vehicle on a sunny day in Northern California with the power available with a typical gasoline powered automobile like a Honda Civic at 140 horsepower. You will need to make an estimate of the size of the roof.

5. Using the average cloud free solar insolation in California, what area of a horizontal PV array would be needed to satisfy the residential electricity needs of a city with 80,000 homes if one assumes an average power need per home of 900 kWhr/month? Assume the PV array has an efficiency of 20%.