

EE/GP140 - Homework Set No 1

Handout 6

Due: Friday, Jan. 18

In class (A65 Mitchell), box outside Mitchell 305, or in TA's office in Packard 302.

1. Use the equation, $c = \lambda f$, to calculate the wavelength in centimeters of radar energy at a frequency of 10 GHz. What is the frequency in gigahertz of radar energy at a wavelength of 25 cm?
2. What is the temperature of boiling water at sea level in degrees Kelvin?
3. What is the peak wavelength for incident radiation from the sun, with a surface temperature of 6000 K? For the Earth's emitted radiation at 255 K? For solar radiation reflected, not thermally emitted, from the Earth's surface?
4. Venus' surface temperature is about 750 K. Sketch, in approximate form, the blackbody radiation curve for Venus, indicating the peak wavelength.
5. An industrial pollutant absorbs radiation strongly at a wavelength of $28\mu\text{m}$. Is it of concern for global warming on Earth, and why?
6. One of the big problems from global warming is the change in sea level that results from melting of the polar ice caps. Estimate how much sea level would rise if the entire Antarctic ice cap were to melt. It may help you to know that the average thickness of the ice cap over Antarctica is 3000 meters. What would happen to Stanford if this ice cap were to melt?
7. A remote sensing radar image of Stanford shows Hoover tower at pixel location (300, 300) and Memorial Church at location (400, 250). Estimate the pixel spacing of this instrument. Approximate values are ok - just show how you got your answer.
8. Complete the exercise at the end of the lab handout and hand it in as part of this assignment.