EE 43/100 Smart Dust Lab: Prelab

Name:_____
TA: _____
Section:_____

1. The antennas on the Smart Dust motes are 6-inch long pieces of insulated wire. (Only 5 inches sticks up straight on the motes you'll use, but let's ignore that detail here.) To work efficiently, a typical radio antenna should be approximately one-quarter of a wavelength long. Recall from physics that for any kind of wave, including radio,

   Wave frequency x Wavelength = Wave's phase velocity

   Calculate the approximate frequency at which such a mote operates (reminder: the velocity of radio waves in free space is 3×10^8 m/s).

2. List at least three applications you can think of for the Smart Dust wireless sensor platforms in your field of study. (Be imaginative!)

3. For the small red LED listed in the table in the Guide, calculate the value of a series current-limiting resistor that will produce the maximum listed current for that LED, assuming that the source voltage is 6 volts. You may assume that the I-V characteristic for the LED is the idealized characteristic – no current flows until the turn-on voltage is reached, at which point the characteristic becomes a vertical line.