

NAME \_\_\_\_\_

***Remote Sensing of the Environment***  
***GEOG/GEOL 4093/5093***  
***Spring Semester 2009***  
***Lab Exercise #1 09/03/2009***  
***Due: 09/10/2009***

**(1) What is remote sensing? (5)**

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**(2) Fill in the blanks in the following table: (8)**

|    | <b>Wavelength</b> | <b>Frequency</b> | <b>Name of spectral region</b> |
|----|-------------------|------------------|--------------------------------|
| a. | _____             | 88.5 MHz         | _____                          |
| b. | 1.0 km            | _____            | _____                          |
| c. | _____             | 37 GHz           | _____                          |
| d. | 600 nm            | _____            | _____                          |
| e. | 10 $\mu$ m        | _____            | _____                          |
| f. | _____             | 60 Hz            | _____                          |
| g. | 5.0 cm            | _____            | _____                          |
| h. | _____             | 1360 kHz         | _____                          |

**(3) What are the peak wavelengths of blackbody emission for objects at the following temperatures? (3)**

- a. 320 K            \_\_\_\_\_
- b. 5700 K           \_\_\_\_\_
- c.  $1.0 \times 10^6$  K    \_\_\_\_\_

**(4) Use the infrared thermometer to measure the temperature of the wall. Note that temperature here \_\_\_\_\_. Use the infrared thermometer to measure the temperature of a computer monitor. Note that temperature here \_\_\_\_\_. What are the amounts of radiation ( $\text{Wm}^{-2}$ ) being emitted from the wall and from the computer? Use an emissivity of 0.97 for all measurements. Show your work below. (6)**

**(5) Describe Wien's displacement law. What does it tell us about the relationship between temperature and wavelength? (4)**

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**(6) Using an initial temperature of  $20\text{ }^\circ\text{C}$  and an uncertainty of  $\pm 5\%$  (i.e. the true temperature could be 5% warmer or 5% cooler), discuss the sensitivity of the Stefan-Boltzmann law for obtaining emittance. *You may need another sheet of paper to show all of your work.* (4)**