

# Assignment 2

Please type your responses into a word document, and submit that on UNM Learn. Be sure to number your responses 1, 2(a), etc. so I know which question you're answering, and **show your work** for all questions.

1. (15 points) *Pluto is 100 times farther from the Sun than Mercury. How much greater is the flux  $F$  of the Sun at Mercury than it is at Pluto, and what does this mean?*
2. (10 points) *Show all of your math in the following: What type of electromagnetic radiation would you observe from..*
  - (a) (5 points) *A star with temperature 5800 K?*
  - (b) (5 points) *A star heated to  $1.0 \times 10^6$  K?*

3. (20 points) *For Hydrogen, the  $n$ th electron's energy is given by*

$$E_n = \frac{-2.18 \times 10^{-18} \text{ J}}{n^2}$$

*where  $J$  stands for Joules, a unit of energy. So,*

$$E_1 = \frac{-2.18 \times 10^{-18}}{1^2} = -2.18 \times 10^{-18} \text{ J}$$

$$E_2 = \frac{-2.18 \times 10^{-18}}{2^2} = -5.45 \times 10^{-19} \text{ J}$$

$$E_3 = \frac{-2.18 \times 10^{-18}}{3^2} = -2.42 \times 10^{-19} \text{ J}$$

- (a) (5 points) *What is the fifth electron energy level of Hydrogen,  $E_5$ ?*
- (b) (5 points) *An electron goes from the third energy level to the ground (first) energy level and emits light in the form of a photon. What is the frequency of this light?*
- (c) (10 points) *Light hits an electron in the ground state and excites it to the next state ( $E_1 \rightarrow E_2$ ). What is the wavelength of this light?*