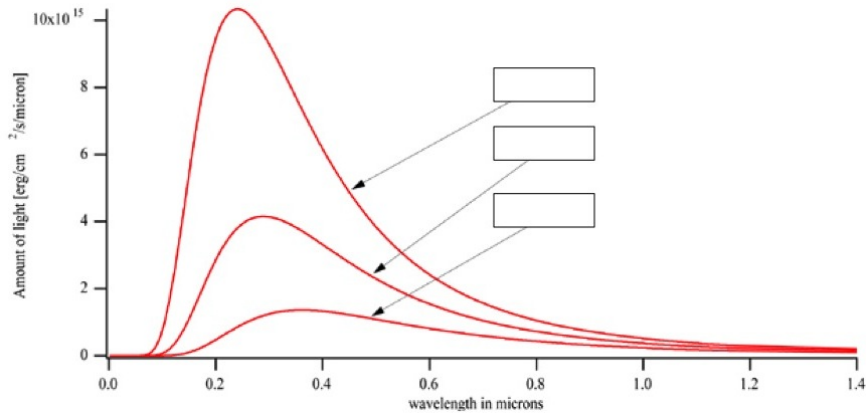


NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

**Homework #3**

1. Find the approximate wavelengths  $\lambda$  of the following colors:
  - (a) Blue \_\_\_\_\_
  - (b) Green \_\_\_\_\_
  - (c) Yellow \_\_\_\_\_
  - (d) Red \_\_\_\_\_
  
2. Why must Astronomers use satellites and Earth-orbiting observatories to study the heavens at X-ray wavelengths?
  
  
  
  
  
  
  
  
  
  
3. Does red light travel faster than blue light? (a) Yes (b) No.
  
4. The main reason astronomers use large telescopes is that large telescopes
  - (a) have a bigger field of view
  - (b) have a larger magnification
  - (c) gather more light
  - (d) none of the above
  
5. In an optical telescope, if the focal length of the objective mirror is  $f_0 = 2\text{m}$ , and the focal length of the eyepiece is  $f_e = 0.5\text{cm}$ , what is the magnification of the telescope?
  
  
  
  
  
  
  
  
  
  
6. Compared to visible light, radio waves have
  - (a) higher energy and longer wavelength
  - (a) lower energy and longer wavelength
  - (a) lower energy and shorter wavelength
  - (a) higher energy and shorter wavelength

The graph below shows the spectrum of light emitted by 3 different temperature objects.



7. What is the name of the type of spectrum seen here, and which object is hottest?
  
8. What are the Temperatures  $T$  of the three different bodies If the wavelengths at the **peak** of the three spectra are, from top to bottom

(a)  $\lambda_{pk} = 0.25\mu m$

(b)  $\lambda_{pk} = 0.30\mu m$

(c)  $\lambda_{pk} = 0.35\mu m$

9. The bright star Betelgeuse in the constellation of Orion has a surface temperature of  $T = 3,400K$ . Approximately what is the dominant, or peak, wavelength  $\lambda_{pk}$  that it emits at? Does Betelgeuse have a more Bluish or Reddish color to it?
  
10. Atoms of different elements have unique spectral lines because each element
  - (a) has atoms of a unique color.
  - (b) has a unique number of neutrons.
  - (c) has a unique set of electron orbits.
  - (d) none of the above, spectral lines are not unique to each type of atom.