

Chemistry 105-Fundamental Chemistry

Name _____

Quiz 3-Thursday, 21 November 1996

Laboratory Section _____.

Answer in the space provided. If you finish early wait quietly until dismissed.

Selected equations and constants:

$$v = \frac{c}{\lambda} \quad E = \frac{hc}{\lambda} \quad E = h\nu \quad E_{\text{atom}} = 2.18 \times 10^{-18} \text{ J} \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \quad \lambda = \frac{h}{m\nu}$$

Planck's constant (h) = $6.6260755 \times 10^{-34} \text{ J s}$

Speed of light in a vacuum (c) = $2.99792458 \times 10^8 \text{ m s}^{-1}$

$1\text{J} = 1 \text{ kg m}^2 \text{ s}^{-2}$

mass of the electron = $9.1093897 \times 10^{-31} \text{ kg}$

1) (6pts) Give a short description of what light is and how it is characterized.

2) (6pts) Calculate the wavelength in nanometers for a photon with an energy of $3.15 \times 10^{-15} \text{ J}$.

3) (6pts) Strontium is often one of the atoms which imparts a strong red coloration to fireworks. If the emission of this red light is at 606 nm, what is the frequency (in s^{-1}) of the light?

4) (6pts) Suppose that green light with a wavelength of 512 nm and an energy of $2.35 \times 10^{-18}\text{J}$ struck your eye. How many photons were striking your eye?

5) (6pts) Assume that Professor Czerwinski has a mass of 77.27 kg and is being chased down the hallway by a mob of angry students at 9.12 m/s shortly after the quiz. What would his wavelength in nanometers be?