

Unit 1 – Chapter 7: Atomic Structure & Periodicity

Name _____

Take Home Quiz

Period _____

1. Indicate whether the following statements are True (+) or False (0).

Blue light has a shorter wavelength than red light.
 X-rays have lower frequencies than radio rays.
 Microwaves have higher frequencies than gamma rays.

2. Photosynthesis (use of the sun's light by plants to convert CO_2 and H_2O into glucose and oxygen) uses light with a frequency of $4.54 \times 10^{14} \text{ Hz} \cdot \text{sec}^{-1}$. What wavelength does this correspond to?

3. Sodium atoms have a characteristic yellow color when excited in a flame. The color comes from the emission of light of 590.0 nm.
 - a) What is the frequency of this radiation?

 - b) What is the change in energy associated with this photon? Per mole of photons?

4. What is the wavelength of an electron (mass = $9.11 \times 10^{-31} \text{ kg}$) traveling at $5.31 \times 10^6 \text{ m/sec}$?

5. Calculate the energy corresponding to the $n = 3$ electron state in the Bohr hydrogen atom.

6. Calculate the energy **change** corresponding to the transition of an electron from the $n = 3$ to $n = 1$ electronic state in the hydrogen atom. Also, identify the type of radiation from this wavelength.