The Nature of Light – Study Guide

*sections 6.1 and 6.2 in OpenStax*

**The Nature of Light (section 6.1)**

The **wavelength, λ,** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The **amplitude** is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The **frequency, ν,** is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that pass a point in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

frequency units are hertz, (Hz) or cycles/s = s-1

1 Hz = 1 s-1

The wavelength and frequency of a wave are related by the following equation:



Where **c** is **the speed of light** in a vacuum = 3.00 x 108 m/s

Einstein proposed that the light energy was delivered to the atoms in packets, called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The energy of one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be found using the equation:



Where h is Planck’s Constant = 6.626 x 10-34 J∙s

The energy of a photon of light is directly proportional to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and inversely

proportional to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Complete the following table:

|  |  |  |
| --- | --- | --- |
| **Wavelength (long or short)** | **Frequency (high or low)** | **Energy (high or low)** |
| long |  |  |
| short |  |  |

**All the wavelengths of light are collectively called the** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **spectrum.**

***Watch the video tutorial on*** [***Frequency Calculations***](https://www.youtube.com/watch?v=0TDhxW-OAUE&feature=youtu.be)

**Atomic Spectroscopy and the Bohr Model (section 6.2)**

When atoms or molecules absorb\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it is often released as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**An emission spectrum** is non-continuous and can be used \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

According to **Bohr’s Model** the electrons travel in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with a \_\_\_\_\_\_\_\_\_\_\_\_distance from the nucleus

Electrons emit radiation when they “jump” from an orbit with higher energy down to an orbit with a \_\_\_\_\_\_\_\_\_\_\_\_(higher or lower) energy.

**End of Chapter 6 Practice Problems**

#3, 7, 9, 23

For detailed solutions to these problems, go to the [OpenStax website](https://openstaxcollege.org/textbooks/chemistry/resources) and download the “Student Answer and Solution Guide.”