

Unit 2 – Ch 5.1 – Wave Properties & Atomic Spectra

WAVE PROPERTIES:

- **Wavelength** – λ (_____) –
 - Unit = _____
- **Frequency** – ν (_____) –
 - Unit = _____
- _____ of wavelength and frequency = _____
 - **C = Speed of Light:** _____
 - **FORMULA:** _____
- _____ Proportional:
 - As wavelength _____, frequency _____.

Ex #1: What is the wavelength of an electromagnetic wave with a frequency of $1.50 \times 10^{13} \text{ Hz (s}^{-1}\text{)}$?
What type of wave is emitted?

Ex #2: Calculate the frequency of a photon (light) with a wavelength of $4.34 \times 10^{-7} \text{ m}$.
What type of wave is emitted?

PARTICLE NATURE OF LIGHT: QUANTUM THEORY:

- Max _____:
 - **QUANTUM** – Minimum _____ quantity _____ or _____
by an atom to _____ different _____ of photons (light).
 - Quantum of energy is _____ proportional to _____ of photon emitted.

PARTICLE NATURE OF LIGHT: QUANTUM THEORY (Continued):

- Planck's Constant:

- **FORMULA:** _____

- $E =$

- $h =$

- $v =$

- **Planck's Constant =**

- "J" = SI unit of energy (_____)

- Einstein's Contribution:

- Confirmed that light as **BOTH** _____ and _____ natures.

- PHOTON:

Ex #3: Tiny water droplets in air disperse white light into a rainbow. What energy is emitted from a violet photon that is $7.23 \times 10^{14} \text{ s}^{-1}$?

Ex #4: A sodium-vapor street light emits yellow light at a wavelength of 589 nm. What energy of sodium atom is involved in this emission?