

Sec 6 Hd 2

CALCULATION PRACTICE — 1

Formulas and Constants

$$c = \lambda \nu$$

$$\nu = \frac{c}{\lambda}$$

$$\lambda = \frac{c}{\nu}$$

$$E = h\nu$$

$$E = \frac{hc}{\lambda}$$

$$c = 2.998 \times 10^8 \text{ m/s} \quad \lambda = \text{wavelength} \quad \nu = \text{frequency} \quad h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s} \quad E = \text{energy}$$

1. List all electromagnetic radiations from low energy to high. (See notes)

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2. What is the wavelength of electromagnetic radiation having a frequency of 5.00×10^{12} Hz?
3. What is the frequency of a wave with a wavelength of 2.3×10^{-7} meters?
4. What is the frequency of electromagnetic radiation having a wavelength of 3.33×10^{-8} m?
5. The laser in a CD player uses light with a wavelength of 720 nm. What is the frequency of this light?
6. An FM radio station has a frequency of 88.9 MHz (1 MHz = 10^6 Hz, or s^{-1}). What is the wavelength of this radiation in **meters**?
7. The U.S. Navy has a system for communicating with submerged submarines. The system uses radio waves with a frequency of 76 s^{-1} . What is the wavelength of this radiation in **meters**?
8. Calculate the energy of a photon of radiation with the frequency of 5.0×10^{14} Hz.
9. Calculate the frequency of a photon if the energy is 5.61×10^{-19} J.

10. Light has a wavelength of about 410 nm. What is its frequency? Calculate the energy of one photon of the light. **What color is the light?**
11. Fireworks are often achieved by heating CuCl to about 1200°C. Then the compound emits light and gives off 3.61×10^{-19} J. What is the wavelength. **What color is the light?**
12. The energy of a photon from a laser is 2.91×10^{-19} J. What is the wavelength of the light in **nm**? **What color is the light?**
13. **The most prominent line in the spectrum of neon is found at 865.4 nm.** What is the frequency? What is the energy of one photon of this wavelength?

Formulas and Constants	
$E = mc^2$	$m = \frac{E}{c^2}$
E = energy m = mass c = 2.998×10^8 m/s	

Be sure to convert all masses to Kg!!!!!!!

14. How much energy is released when .00932 **Kg** is converted to energy?
15. How much energy is released when .0892 **g** is converted to energy?
16. How much energy is released when 3.45**g** is converted to energy?
17. What mass in **Kg** is converted to energy if 1.23×10^8 Joules of energy are released?
18. What mass in **grams** is converted to energy if 5.67×10^{14} Joules of energy are released?