

Mixed Wave Calculation Practice

Use the examples below to guide you through completing this assignment

Variables	Units
c: Speed of Light* (constant)	$3.00 \times 10^8 \frac{m}{s}$ (meters per sec)
f: Frequency	Hz or s^{-1} (Hertz or seconds ⁻¹)
λ : wavelength	m(meters)
h: Planck's Constant*	$6.63 \times 10^{-34} \text{ J}\cdot\text{s}$ (joules x sec)
E: energy	J (joules)

Formulas
$C = f \lambda$
$E = hf$
$E = \frac{hc}{\lambda}$

Directions: In each empty box fill with the correct information INCLUDING the units.

Example 1) Green lights on a traffic light have a wavelength of $5.23 \times 10^{-7} \text{ m}$. What is the frequency?

Given	Formula	Work	Answer
$\lambda = 5.23 \times 10^{-7} \text{ m}$	$C = f \lambda$	$3.00 \times 10^8 \text{ m/s}$	
$f = ?$		\div	
$C = 3.00 \times 10^8 \text{ m/s}$	$C/\lambda = f$	$5.23 \times 10^{-7} \text{ m}$	$5.74 \times 10^{14} \text{ s}^{-1}$

Example 2) Find the energy of a red photon with a frequency of $4.57 \times 10^{14} \text{ Hz}$.

Given	Formula	Work	Answer
$E = ?$	$E = hf$	$6.63 \times 10^{-34} \text{ Js}$	
$f = 4.57 \times 10^{14} \text{ Hz}$		\times	
$H = 6.63 \times 10^{-34} \text{ Js}$		$4.57 \times 10^{14} \text{ Hz}$	$3.03 \times 10^{-19} \text{ J}$

1. What is the energy of a $7.66 \times 10^{14} \text{ s}^{-1}$ wave?

Given	Formula	Work	Answer

2. What is the frequency of a wave carrying $8.35 \times 10^{-18} \text{ J}$ of energy?

Given	Formula	Work	Answer

3. What is the frequency of a wave having a wavelength of $1.78 \times 10^{-15} \text{ m}$?

Given	Formula	Work	Answer

4. What is the wavelength of a 3.12×10^{18} Hz wave?

Given	Formula	Work	Answer

5. What is the wavelength of wave having an energy of 1.31×10^{-22} J ?

Given	Formula	Work	Answer