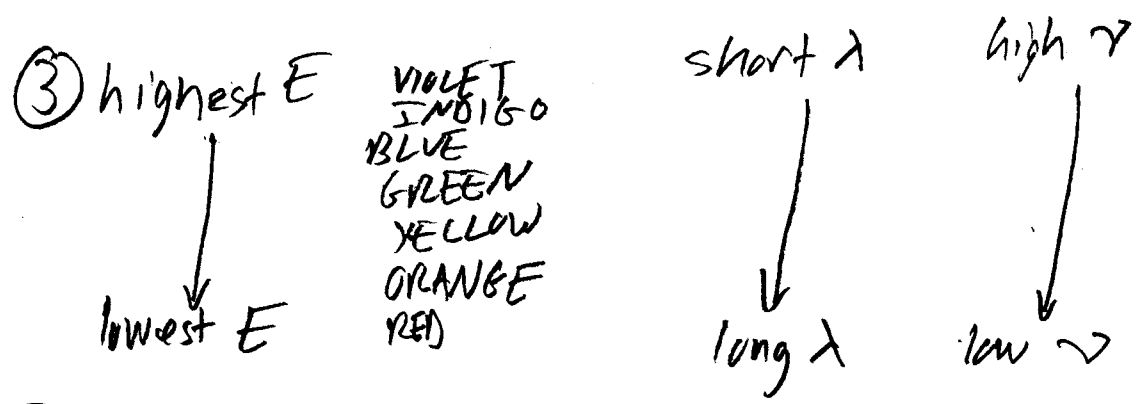
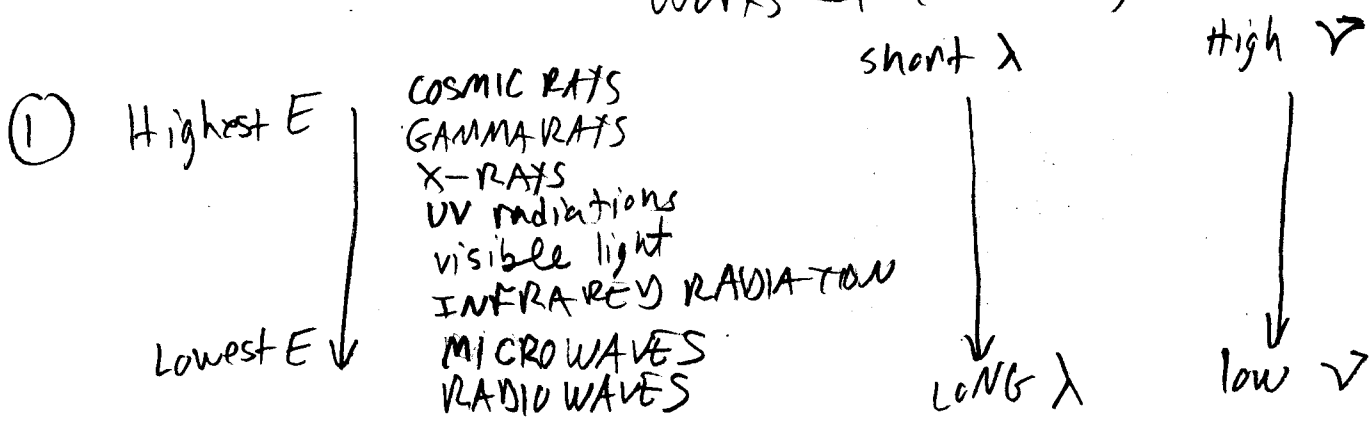


Light & Quantum Theory Worksheet (Answers)



④ high, high ⑤ low, low

⑥ INVERSELY, DIRECTLY ⑦ JOULES ⑧ meters

⑨ Hertz, Hz / s / s⁻¹ / cycles/s

⑩ a) $513 \text{ m} \times \frac{10^9 \text{ nm}}{1 \text{ m}} = 5.13 \times 10^{11} \text{ nm}$

b) $8.03 \times 10^{-6} \text{ m} \times \frac{10^9 \text{ nm}}{1 \text{ m}} = 8.03 \times 10^3 \text{ nm}$

⑪ a) $755 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}} = 7.55 \times 10^{-7} \text{ m}$

b) $0.272 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}} = 2.72 \times 10^{-10} \text{ m}$

$$(12) E = h\nu = (6.626 \times 10^{-34} \text{ Js})(5.22 \times 10^{21} \frac{1}{\text{s}})$$

$$= 3.46 \times 10^{-12} \text{ J}$$

$$(13) E = h\nu = (6.626 \times 10^{-34} \text{ Js})(7.06 \times 10^{14} \frac{1}{\text{s}})$$

$$c = \lambda\nu$$

$$\nu = \frac{c}{\lambda} = \frac{3.00 \times 10^8 \frac{\text{m}}{\text{s}}}{425 \text{ nm}} = \frac{3.00 \times 10^8 \frac{\text{m}}{\text{s}}}{4.25 \times 10^{-7} \text{ m}} = 7.06 \times 10^{14} \frac{1}{\text{s}}$$

$$\rightarrow E = 4.68 \times 10^{-19} \text{ J}$$

$$(14) c = \lambda\nu$$

$$\lambda = \frac{c}{\nu} = \frac{3.00 \times 10^8 \frac{\text{m}}{\text{s}}}{5.28 \times 10^{15} \frac{1}{\text{s}}} = 5.68 \times 10^{-8} \text{ m} = 56.8 \text{ nm}$$

(15) Use reference tables, not p. 299.

(a) NO

(b) The wavelength is outside the visible region.
 (Visible region is $400 \text{ nm} \rightarrow 700 \text{ nm}$
 $4 \times 10^{-7} \text{ m} \quad 7 \times 10^{-7} \text{ m}$)

(c) Too high in energy. It is off to the "high energy" side of the visible region.

~~56.8 nm~~

violet indigo blue green yellow orange red
 $400 \text{ nm} \rightarrow 700 \text{ nm}$
 VISIBLE SPECTRUM

(d) ultraviolet, maybe X-rays.