Quiz 8: Misc.

$$e = 1.6 \times 10^{-19}\,\text{C} \qquad h = 6.63 \times 10^{-34}\,\text{J}\cdot\text{s} \qquad 1\,\text{nm} = 10^{-9}\,\text{m} \qquad E = hf = \frac{hc}{\lambda} \qquad E = q\Delta V$$

1. A light-emitting diode (LED) emits blue photons of wavelength $480\,\text{nm}$. What would be the minimum voltage you would expect to apply to the LED before it emits light? (Hint: we assume all of the potential energy of one electron, $e\Delta V$, is converted into light.)

2. An atom has energy levels of (only) $E_1 = 1.2$, $E_2 = 2.4$, and $E_3 = 4.8\,\text{eV}$ (where $1\,\text{eV} = 1.6 \times 10^{-19}\,\text{J}$). What are the possible **energies** of photons that could be emitted by this atom?

3. Myopia, also called near- or short-sightedness, is a refractive defect of the eye in which collimated light produces image focus in front of the retina when accommodation is relaxed, rather than directly on the retina. What sort of lens(es) could be used to correct this condition?

□ convex (curves away on top)

□ it depends on the degree of myopia

□ concave (curves toward on top)

4. An object is placed to the left of a converging lens. Which of the following statements are true and which are false?

1. The image is always to the right of the lens
2. The image can be upright or inverted
3. The image is always smaller or the same size as the object

□ 1 and 2 are true, 3 is true

□ 2 and 3 are false, 1 is true

□ 1 and 3 are false, 2 is true

□ 2 and 3 are true, 1 is false