Chemistry I-Standard

Electromagnetic Spectrum Problems #1

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| **Formulas and Constants** |
| λ = wavelength (m) | ν = frequency | c = λν | E = hν | E = energy (J) |
| Speed of light: c= 3.00 x 108 m/sPlanck’s constant: h = 6.626 x 10-34 J∙s |

1. Calculate the energy of electromagnetic radiation that has a frequency of 5.56 x 106 Hz.
2. Calculate the frequency of electromagnetic radiation with a wavelength equal to 6.67 x 10-7 m.
3. EM radiation at the blue end of the visible spectrum has a wavelength of 4.0 x 10-7 m.
4. Calculate the frequency of the radiation.
5. Calculate the energy of this radiation.

Use the Reference Tables (Bohr Model) to answer question 4 and 5:

1. What is the wavelength of light emitted when the electron falls from *n*=6 to *n*=2? \_\_\_\_\_\_\_\_\_
2. What is the wavelength of light emitted when the electron falls from n=5 to n=3? \_\_\_\_\_\_\_\_\_
3. Label the following relationships as either DIRECTLY proportional or INVERSELY proportional.

a. λ and ν b. E and ν c. E and λ

True / False: Determine whether the following statements are true or false. IF FALSE, correct the statement so it becomes true.

1. T - F A photon of green light has a longer wavelength than a photon of yellow light.
2. T - F A microwave photon has a lower frequency than a photon of infrared radiation.
3. T - F If a quantum of radiation has a high energy then one could also conclude it has a low frequency.