

Study Guide for **Honors** Physics: Quantum Physics

*This review contains questions very similar to the test. It is meant to let you know what you need to study and put on you 15 square inches of cheat sheet. **Do not turn this in; I will not grade it, but you can ask me to check it.***

1. What is a quantum? What is a quantum of light called?
2. Which has more energy per photon - microwaves or ultraviolet light? Why?
3. If light of a frequency of $f = 1.1 \times 10^{15}$ Hz is incident upon zinc, will electrons be ejected? Explain and support your answer with numerical evidence. Note: if this sort of question is on the test, the work function will be provided.
4. If a beam of yellow light and a beam of indigo light have exactly the same total amount of energy, which beam has the greater number of photons? Explain.
5. Do we notice the wavelength of moving things in our normal world? Explain.
6. Who first discovered the nucleus, and how did he do it?
7. Find the energy of a photon with frequency $f = 6 \times 10^{14}$ Hz
8. Find the frequency of a photon with energy $E = 5$ eV
9. The deBroglie wavelength of an electron orbiting a certain atom is 1.5 nanometers. Find the circumference of the first, second, and third energy levels in the Bohr model of this atom.
10. Is an energy level with a circumference of 4 nanometers possible in the atom from problem nine? Explain.
11. An electron falls from an energy level of $E = 7$ eV to an energy level of $E = 5$ eV in an atom. What is the frequency of the photon that is emitted?

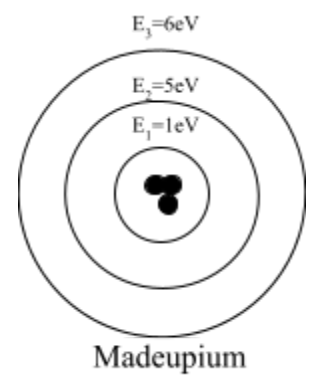
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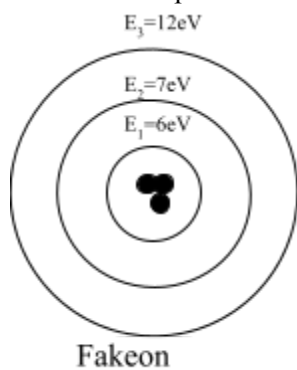
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12. You observe light of frequencies $f = 2.42 \times 10^{14} \text{ Hz}$, $f = 1.21 \times 10^{15} \text{ Hz}$, and $f = 1.45 \times 10^{15} \text{ Hz}$ coming from a star. Which of the elements below are present in the star? Explain.



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