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Atomic Spectra lab
21 points

1. **Purpose:** What is the purpose of this lab? What will you be investigating during this lab? (1 point)

2. **Procedure:**
 - a. Look through the spectroscope at the fluorescent lights (the lights in the classroom). Draw/color the pattern of light that you see. Note: observe a violet (sharp), a blue line (blurred), a green line (sharp), a yellow line (blurred), an orange line (blurred) and several red lines (blurred).
 - b. Look through the spectroscope at the hydrogen gas tube. Draw/color the pattern of light you see. Note: you should see three lines.
 - c. Look through the spectroscope at the helium gas tube. Draw/color the pattern of light you see. Note: you should be able to see six lines.

3. **Results:** Record your observations here. (3 points)

Fluorescent Light:



Hydrogen:



Helium:



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4. Post Lab questions:

1. What was the type of electromagnetic radiation that you observed using the spectroscope today? What is this range in wavelength for this type of radiation? (2 points)

2. In a hydrogen atom, the light emitted when an electron falls from the third energy level to the second energy level is 656 nm and the light emitted when an electron falls from the fourth energy level to the second energy level is 486 nm. Determine the wavelength (in meters), frequency (in Hertz) and energy (in Joules) produced for each of these wavelengths. (6 points)

<p>Wavelength</p>	<p>4 → 2 486 nm</p> <p>$\lambda = \text{_____} m$</p>	<p>3 → 2 656 nm</p> <p>$\lambda = \text{_____} m$</p>
<p>Frequency $C = \lambda \cdot \nu$</p>	<p>$\nu = \text{_____} Hz$</p>	<p>$\nu = \text{_____} Hz$</p>
<p>Energy $E = h \cdot \nu$</p>	<p>E= _____ J</p>	<p>E= _____ J</p>

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3. Calculate energy, wavelength and frequency. Show your work. (4 points)
- Calculate the energy of radiation that would be emitted when an electron falls from the fourth energy level to the third energy level.
 - Calculate the frequency of this radiation.
 - Calculate the wavelength of this radiation.
 - Could this radiation be detected using a spectroscope? Explain why or why not.

5. Conclusion:

- Explain in detail what happens when electricity is applied to an atom. Use the words in the following word bank in your answer. (4 points)

electron	Ground state	Excited state	electricity
emit	light	absorb	relax

- What could atomic spectrum be used to do? Give one application for atomic spectrums. (1 point)