

Bohr Atom

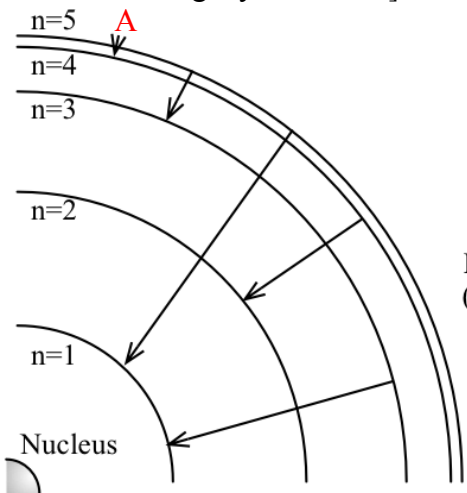
1. Explain the difference between the continuous spectrum of white light and the atomic emission spectrum of an element.
2. Why do we say that the electrons in the hydrogen atom quantized?
3. How did Bohr propose that electrons exist in atoms? What was this model called?
4. Why are electrons attracted to the nucleus?
5. How do electrons become excited?
6. What happens to electrons when they relax?
7. According to the Bohr atomic model, why do atomic emission spectra contain only certain frequencies of light?

8. Complete the following table for the four visible transitions in the hydrogen spectrum.

	Color	Wavelength (nm)	Wavelength (m)	Frequency (Hz)	Energy (J)
a.	Red	656			
b.	Green	486			
c.	Blue	434			
d.	Violet	410			

Show sample calculations for letter (a) below:

9. Below is a hypothetical atom with five indicated transitions and its emission spectrum. Using what you know about the relationship between the ΔE and the frequency of light, label the energy diagram with the correct lines from the spectrum and indicate which energy levels comprise each ΔE . [I have labeled transition A to get you started.] Which two energies add up to a one of the other energies?



Spectrum

	A	B	C	D	E

Low Frequency
(Low Energy)

High Frequency
(High Energy)

$\Delta E_A = E_5 - E_4$	$\Delta E_C =$ _____	$\Delta E_E =$ _____
$\Delta E_B =$ _____	$\Delta E_D =$ _____	

Answers: 8a) 6.56×10^{-7} m, 4.56×10^{14} Hz, 3.03×10^{-19} J; 8b) 4.86×10^{-7} m, 6.17×10^{14} Hz, 4.09×10^{-19} J; 8c) 4.34×10^{-7} m, 6.91×10^{14} Hz, 4.58×10^{-19} J; 8d) 4.10×10^{-7} m, 7.32×10^{14} Hz, 4.85×10^{-19} J