13 quantities of Bohr's Atomic Model.

$$r_n = (0.529\,\text{Å})\frac{n^2}{Z} = \left(\frac{nh}{2\pi}\right)^2 \cdot \left(\frac{1}{kZe^2 m_e}\right)$$

$$v_n = (2.18 \times 10^6\ m/s)\frac{Z}{n} = \left(\frac{2\pi}{nh}\right)\left(kZe^2\right)$$

↳ (doesnt depend on m_e)

PE
+KE
TE

$$PE = -\frac{kZe^2}{r_n} = -kZe^2\left(\frac{2\pi}{nh}\right)^2 kZe^2 m_e$$

$$PE = -\frac{kze^2}{r_n} = -kze^2\left(\frac{2\pi}{nh}\right)^2 kze^2 m_e$$

$$= -\left(\frac{4\pi^2 k^2 e^4 m_e}{h^2}\right)\left(\frac{z^2}{n^2}\right)$$

$$\boxed{PE = -2KE = -2E_n}$$

$$TE = PE + KE$$

$$\boxed{TE = -KE = -E_n}$$

$$\boxed{KE \rightarrow E_n}$$

$$\boxed{-2E_n + E_n = -E_n}$$

$$K.E. = \frac{1}{2} m_e v_n^2$$

$$= \frac{1}{2} m_e \left[\left(\frac{2\pi}{nh}\right) kze^2\right]^2$$

$$\boxed{KE = \left(\frac{2\pi^2 k^2 e^4 m_e}{h^2}\right)\frac{z^2}{n^2}}$$

$$KE = (\quad)\, z^2/n^2$$

$$TE = -\left(\frac{2\pi^2 k^2 e^4 m_e}{h^2}\right) z^2/n^2$$

Energy Levels & Excitation/Ionization energies.

$$\boxed{E_n = -(13.6\,eV)\frac{Z^2}{n^2}}$$

$Z=1$, for H atom.

$$\boxed{E_1 = -13.6\,eV}$$

$$E_2 = -\frac{13.6}{4} = -3.4\,eV$$

$$E_3 = -\frac{13.6}{9} = -1.51\,eV$$

$$E_4 = -\frac{13.6}{16} = -0.85\,eV$$

(H-Spectrum)

$$\boxed{E_\infty = 0}$$

$$E_5 = \frac{-13.6}{25} = -0.54\,eV.$$

When an e^- jumps from lower n to higher n,

$\Rightarrow$ absorption spectrum.

higher n to lower n

$\Rightarrow$ emission spectrum.

$$TE = -\left(\frac{2\pi^2 k^2 e^4 m_e}{h^2}\right)\frac{Z^2}{n^2}$$

Energy Difference b/w two orbits?

$$\boxed{\Delta E = \left[\frac{2\pi^2 k^2 e^4 m_e Z^2}{h^2}\right]\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)}$$

$$= \frac{hc}{\lambda}$$

$$\boxed{\frac{1}{\lambda} = \left(\frac{2\pi^2 k^2 e^4 m_e Z^2}{h^2 \cdot (hc)}\right)\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)}$$

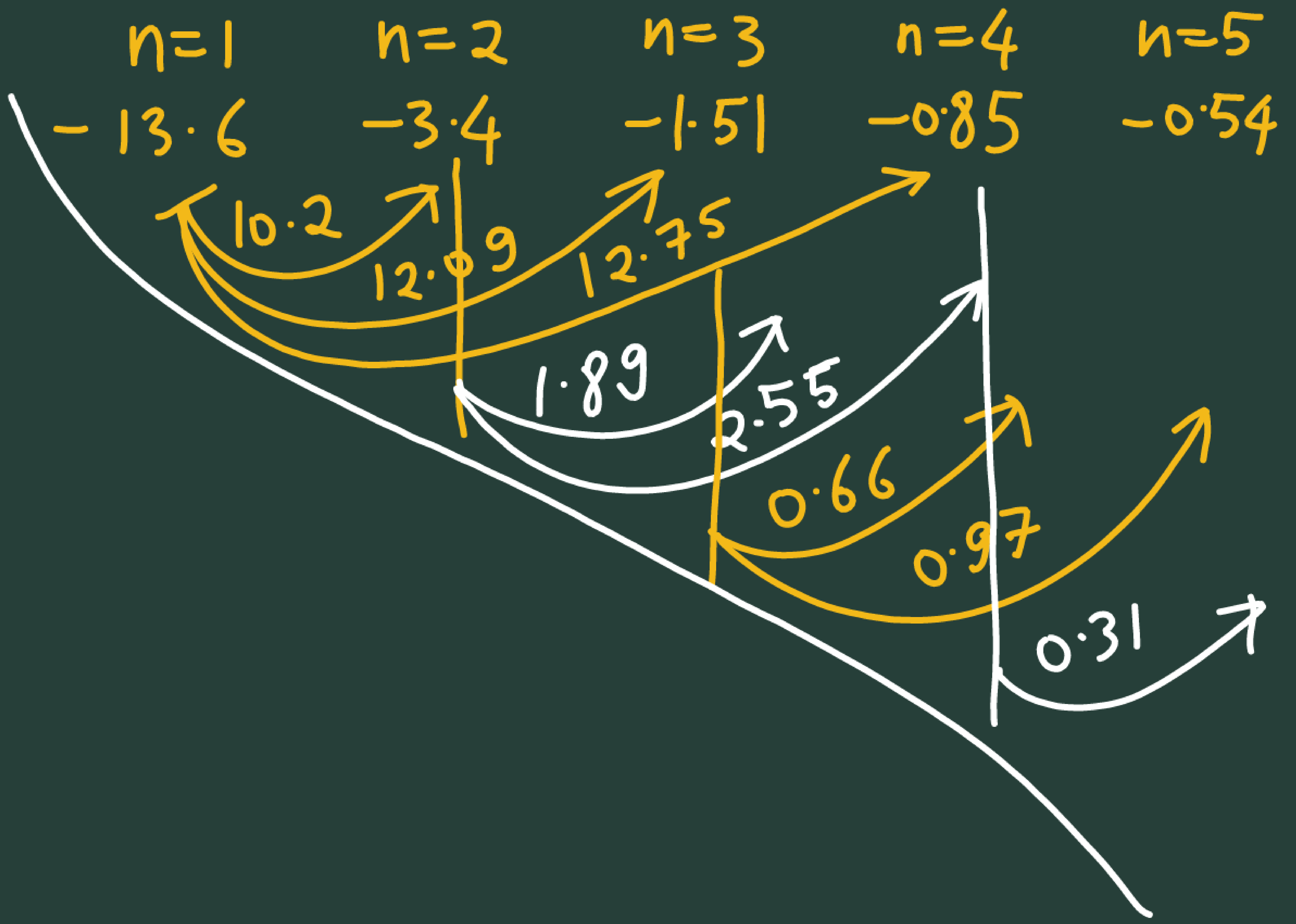
$$\boxed{\frac{1}{\lambda} = R Z^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)}$$

$$\boxed{R = \frac{2\pi^2 k^2 e^4 m_e}{h^3 c} = 1.091 \times 10^7\ m^{-1}}$$

Energy Levels & Excitation

(eV)

H-atom



	$n=1$	$n=2$	$n=3$
$He^{+} \rightarrow$	-54.4	-13.6	-6.08
$Li^{++} \rightarrow$	-122.4	-30.6	-13.6

$$-54.4 \xrightarrow{40.8} -13.6 \qquad -54.4 \xrightarrow{48.36} -6.08$$

$$-122.4 \xrightarrow{91.8} -30.6 \qquad -122.4 \xrightarrow{108.8} -13.6$$