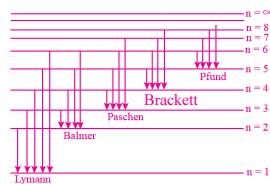


13. ATOMS



IMP DEFINITIONS & FORMULAS

- An atom** contains equal amounts of positive and negative charges to make the atom as a whole neutral.

- In **Thomson's model** of atom, positive charge is distributed all over the atom and the electrons are embedded in it like seeds in a watermelon.

- In **Rutherford's model** of atom, the central part of the atom is called nucleus. The nucleus contains almost total mass and total positive charge of the atom. Electrons revolve around the nucleus like planets revolve around the sun.

- Bohr's 1st postulate:** The electrons revolve only in certain stable orbits called stationary orbits, without emitting any radiant energy.

- Bohr's 2nd postulate:** The angular momentum of the electron revolving in a stationary orbit is an integral multiple of $h/2\pi$.
 - Angular Momentum: $L = n \left(\frac{h}{2\pi} \right)$, $n = 1, 2, 3, \dots$

- Bohr's 3rd postulate:** When an electron jumps from one stationary orbit to a lower energy orbit, a photon is emitted with an energy equal to the difference between the energies of those two orbits. $E_i - E_f = h\nu$

- Expression for radius of electron orbit (r_n)**

$$r_n = \frac{\epsilon_0 h^2 n^2}{\pi m e^2}$$

- Expression for velocity of electron in n^{th} orbit of hydrogen atom is $v_n = \frac{e^2}{2\epsilon_0 h n}$**

- Expression for kinetic energy of electron in n^{th} orbit of hydrogen atom is $K_n = \frac{me^4}{8\epsilon_0^2 h^2 n^2}$**

- Expression for potential energy of electron in n^{th} orbit of hydrogen atom is $U_n = -\frac{me^4}{4\epsilon_0^2 h^2 n^2}$**

BULLET MASTER'S

PHYSI BEATS!

13) ATOMS [1 SAQ]

Physics ⚡ Chemistry!

- You Know:** Atoms in Sr. Inter **Physics** is simply **Atomic Structure** in Jr. Inter **Chemistry**.
- Once again you wish your most favourite Scientist **Mr. Bohr!**

What a repeat!

Thomson's model of atom, Rutherford's atomic model, Bohr's theory of Hydrogen atom, Hydrogen Spectrum, de Broglie's explanation to Bohr's postulates, radius and energy of revolving electron in hydrogen atom
 ☞ All these are all already studied in Jr. Inter Chemistry

IPE View:

IMP SAQ: Limitations of Bohr's theory, Rutherford's atomic model and drawbacks, Types of spectral Series of Hydrogen atom