Bohr's atomic model

On the basis of quantum atomic theory, Nills Bohr modify Rutherford's nuclear theory and proposed on known as bohr's atomic model.

* This model was based on quantum theory of radiation and classical laws of physics.
* Bohr model is applicable only for single electron species like H, He^+, Li^{2+} etc.
* Bohr model is based on particle nature of electron.

Coulombic force $= \frac{kq_1q_2}{r^2}$

Centrifugal force $= \frac{mv^2}{r}$

Angular momentum $= mvr$

Important postulates :→

(i) The atom has a nucleus where all the protons and neutrons are present. The size of the nucleus is very small. it is present at the centre of the atom.

(ii) (i) Negative charge electron revolve around the nucleus in the same way as the planets revolve around the sun.

(ii) The path of electron is circular.

(iii) The attraction force (coulombic or electro-static force) betn the nucleus and the electron is equal to centrifugal force of the moving electron.

i.e

Attraction force towards nucleus = Centrifugal force.

(3) Electrons can revolve only on those path for which angular momentum is quantised i.e an integral multiple of $\frac{h}{2\pi}$ i.e

$$\boxed{mvr = \frac{nh}{2\pi}} = n\hbar$$

$$\Rightarrow \boxed{\hbar = \frac{h}{2\pi}}$$

Where, m = mass of electron
v = velocity of electron
r = Radius of orbit
n = orbit no. (+ve Integer number i.e 1, 2, 3, 4---)
h = Planck's const.
π = Const
$\hbar$ =

Note:→ Angular momentum can have value such as $\frac{h}{2\pi}, \frac{2h}{2\pi}, \frac{3h}{2\pi}, \frac{4h}{2\pi}, \frac{5h}{2\pi}$, --- but can not have fractional values such as $1.5\frac{h}{2\pi}, 1.2\frac{h}{2\pi}, 0.5\frac{h}{2\pi}$ ---

(4) The orbits in which electron can revolve are known as stationary orbits because in these orbits energy of electron is always const.

(5) Each stationary orbit is associated with definite amount of energy therefore these orbits are also called as energy levels and are numbered as 1, 2, 3, 4, 5, --- or K, L, M, N, O, --- from the nucleus outwards.