ATOMS MINDMAP

#Rutherford's Model:→

Postulates - Atoms have a central, massive, positively charged core around which electrons revolve.

→ Size of nucleus = 1 fermi = 10^{-15} m

Drawbacks - Doesn't explain stability of atom.

→ doesn't explain the atomic spectra.

$r = \frac{e^2}{4\pi\varepsilon_0 mv^2}$ $K = \frac{e^2}{8\pi\varepsilon_0 r}$ $U = \frac{-e^2}{4\pi\varepsilon_0 r}$

#Bohr's Model:→

Postulates -

→ Electrons revolve around the nucleus in stationary orbits.

→ Angular momentum :- $mv_n r_n = \frac{nh}{2\pi}$

→ An electron can make transition to a lower energy state.

Energy of the photon released - $h_f = E_i - E_f$

→ For H-like atoms -

$K.E. = \frac{KZe^2}{2r}$

$V_n = \left[\left(2.18 \times 10^6 \times \frac{Z}{n}\right)\right]$ m/s.

$P.E. = -\frac{KZe^2}{r}$

$r_n = \left[\left(0.53 \times \frac{n^2}{Z}\right)\right]$ Å

$E = -13.6\frac{Z^2}{n^2}$ eV

#Atomic Spectra:→

$\frac{1}{\lambda} = Rz^2\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$

For Lyman series (UV region) →

$n_1 = 1$ and $n_2 = 2, 3, 4, \ldots$

For Balmer series (Visible region) →

$n_1 = 2$ and $n_2 = 3, 4, 5, \ldots$

For Paschan series (Infrared region) →

$n_1 = 3$ and $n_2 = 4, 5, 6, \ldots$

#X-Rays:→

$\lambda_{min} = \frac{hc}{eV}$

$\lambda_{min} = \frac{1200}{V}$ Å

$\sqrt{f} = \sqrt{\frac{3Rc}{4}}(Z-1)$

$\sqrt{f} = a(Z-1)$

NEET SLAYER