Previous Year JEE Problems

According to Bohr's atomic theory :

(A) Kinetic energy of electron is $\propto \frac{Z^2}{n^2}$.

(B) The product of velocity (v) of electron and principal quantum number (n), $'vn' \propto Z^2$.

(C) Frequency of revolution of electron in an orbit is $\propto \frac{Z^3}{n^3}$.

(D) Coulombic force of attraction on the electron is $\propto \frac{Z^3}{n^4}$.

Choose the most appropriate answer from the options given below :

A (A), (C) and (D) only

B (A) only

C (C) only

D (A) and (D) only

Explanation

According to Bohr's theory,

I. $KE \propto \frac{Z^2}{n^2}$ or $13.6 \propto \frac{Z^2}{n^2} \frac{(eV)}{(atom)'}$

($\therefore$ Correct)

II. Speed of electron $\propto \frac{Z}{n}$

(Here, Z = atomic number, n = number of shells)

$\therefore v \times n \propto Z$ ($\therefore$ Incorrect)

III. Frequency of revolution of electron $= \frac{v}{2\pi r}$

Frequency $\propto \frac{Z^2}{n^3}$ ($\because v \propto \frac{z}{n}, r \propto \frac{n^2}{z}$) ($\therefore$ Incorrect)