

The electron in a hydrogen atom makes a transition from an excited state to the ground state. Which of the following statements is true? **(IIT JEE, 2000)**

- a. Its kinetic energy increases and its potential and total energies decrease.
- b. Its kinetic energy decreases, potential energy increases, and its total energy remains the same.
- c. Its kinetic and total energies decrease and its potential, energy increases.
- d. Its kinetic, potential, and total energies decrease.

We know that as the electron comes nearer to the nucleus, the potential energy decreases $\left(\frac{-KZe^2}{r} = \text{PE and } -r \text{ decreases} \right)$.

The KE will increase $\left[\because KE = \frac{1}{2} |PE| = \frac{1}{2} \frac{kZe^2}{r} \right]$.

The total energy decreases $\left[TE = \frac{1}{2} \frac{kZe^2}{r} \right]$.