EXCITATION ENERGY AND EXCITATION POTENTIAL

- **Excitation:** The process of absorption of energy by an electron so as to raise it from a lower energy level to some higher energy level is called *excitation*.
- **Excited State:** The states of an atom other than the ground state are called its excited states.

$n = 2,$	first excited state
$n = 3,$	second excited state
$n = 4,$	third excited state
$n = n_0 + 1,$	n_0^{th} excited state

- **Excitation Energy:** Energy required to move an electron from ground state of the atom to any other excited state of the atom is called excitation energy of that state.

$$E_{excitation} = E_{higher} - E_{lower}$$

Energy in ground state of H atom = –13.6 eV
Energy in first excited state of H atom = –3.4 eV
Ist excitation energy = – 3.4 – (– 13.6) = 10.2 eV.

- **Excitation Potential:** Potential difference through which an electron must be accelerated from rest so that its kinetic energy becomes equal to excitation energy of any state is called excitation potential of that state.

$$V_{excitation} = \frac{E_{excitation}}{e}$$

Ist excitation energy = 10.2 eV, so Ist excitation potential = 10.2 V.

$n = 1,$	$E_1 = -13.6$ eV.	This is the ground state energy.
$n = 2,$	$E_2 = -3.4$ eV.	This is the first excited level.
$n = 3,$	$E_3 = -1.51$ eV.	This is the second excited level.
⋮	⋮	⋮
$n = \infty,$	$E_x = 0.$	The atom is said to be ionised.

BINDING ENERGY OR SEPARATION ENERGY

- Energy liberated when constituents of a system are brought from infinity to assemble the system. The binding energy is negative of ionization energy.

$$E_{\text{binding}} = E_n$$

- Energy required to move an electron from any state to $n = \infty$ is called binding energy of that state or energy released during formation of an H-like atom/ion from $n = \infty$ to some particular state n is called binding energy of that state. Binding energy of ground state of H atom = 13.6 eV.