

Question 10. Not considering the electronic spin, the degeneracy of the second excited state ( $n = 3$ ) of the H atom is 9, while the degeneracy of the second excited state of  $H^-$  is.

$H^-$  is a 2 electron system,

The three following rows show the ground state, 1st excited state and the second excited state.

$1s^2$

$1s^1, 2s^1$

$1s^1, 2p^1$

Since the excited electron is in the p orbital, it has 3 degenerate orbitals.

The most important idea here is that we just consider one electron undergoing these transitions.