

41. (a) We take the electrostatic potential energy to be zero when the electron and proton are far removed from each other. Then, the final energy of the atom is zero and the work done in pulling it apart is $W = -E_i$, where E_i is the energy of the initial state. The energy of the initial state is given by $E_i = (-13.6 \text{ eV})/n^2$, where n is the principal quantum number of the state. For the ground state, $n = 1$ and $W = 13.6 \text{ eV}$.
- (b) For the state with $n = 2$, $W = (13.6 \text{ eV})/(2)^2 = 3.40 \text{ eV}$.