**Question 3. The ground state energy of the hydrogen atom is −13.6 eV. Consider an electronic state ψ of He+ whose energy, azimuthal quantum number and magnetic quantum number are −3.4 eV, 2 and 0, respectively. Which of the following statement(s) is(are) true for the state ψ?**

**A. It is a 4d state**

**B. The nuclear charge experienced by the electron in this state is less than 2e, where e is the magnitude of the electronic charge**

**C. It has 2 angular nodes**

**D. It has 3 radial nodes**

**Solution:** (A, C)

$E_{He+} = -13.6 \times (2)^2 / n^2 = -3.4 = -13.6 / 4$

$n^2 = 16$ so $n = 4$

Quantum number is

$n = 4, \ell = 2, m = 0$

So, subshell is = d

Angular node = $\ell = 2$

Radial node = $[n = \ell - 1] = 4 - 2 - 1 = 1$