For the ground state, the electron in the H-atom has an angular momentum =? according to the simple Bohr model. Angular momentum is a vector, and hence there will be infinitely many orbits with the vector pointing in all possible directions. In actuality, this is not true,

A. because Bohr model gives incorrect values of angular momentum.

B. because only one of these would have a minimum energy.

C. angular momentum must be in the direction of spin of electron.

D. because electrons go around only in horizontal orbits.

Answer:

Option (a) is the correct answer as -

Neil Bohr proposed that the magnitude of electron's angular momentum is quantized

$$i.e\ L = mv_n r_n = n\left(\frac{h}{2\pi}\right)\ where\ n = 1, 2, 3.....$$

each value of n corresponds to a permitted value of the orbit radius.

r_n=Radius of n^{th}, v_n=corresponding speed

Angular momentum given by the Bohr's model is a vector quantity, and the model only give the magnitude of the angular momentum. Therefore, angular momentum is not described to a full extent by the Bohr's model. So, the

values given of the angular momentum of revolving electron by the Bohr's model are not correct.