

Chemistry - 11th Class Chemistry Short Questions Chapter 5 Preparation

Q1. How the energy of the photon can be calculated from the measurement of the frequency, wavelength or wave number of the photon?

Ans 1:

Q2. How do you prove that the energy associated with the electron which is revolving around the nucleus of H-atom is negative?

Ans 1:

Q3. State Pauli's exclusion principle and Hund's rule?

Ans 1: According to Pauli's principle "no two electrons in an atom can have the same set of four quantum numbers". According to Hund's rule, "if degenerate orbitals are available and more than two electrons are to be placed in them, then place them in separate orbitals with the same spins rather than in the same orbital with the opposite spins."

Q4. The magnetic quantum number gives us the orientation of orbital in space. Justify it.

Ans 1: In order to designate the directions of p-orbitals in p-subshell, we need an additional quantum number and that is called magnetic quantum number. It tells us the orientation of orbital in space p-subshell has three orbitals and thus have three directions in space. For each direction there is a separate value of magnetic quantum number.

Q5. Energy of an electron is inversely proportional to but energy of higher orbits are always greater than those of the lower orbits. Why?

Ans 1:

Q6. The energy difference between adjacent levels goes on decreasing sharply. Why?

Ans 1:

If we put the value of n as 1,2,3,4 we get the energies of various orbits of hydrogen atom. These values are as follows:

$$E_1 = -2.18 \times 10^{-18} \text{J}$$

$$E_2 = -0.54 \times 10^{-18} \text{J}$$

$$E_3 = -0.24 \times 10^{-18} \text{J}$$

$$E_4 = -0.14 \times 10^{-18} \text{J}$$

As is clear from these values that energy differences between adjacent levels go on decreasing from lower to the higher level.

Q7. Heisenberg's uncertainty principle has no relation with Bohr's atomic model. Justify it.

Ans 1: Since the electron has wavy nature and paths are elliptical as well, so the simultaneous determination of position and momentum is not possible. But Bohr's model does not accommodate the wavy nature of electron. He says that the paths are fixed orbits and their orbits are planar. It means that Bohr's model is very simple as compared to Heisenberg's uncertainty principle.

Q8. How do you come to know that the velocities of electrons in higher orbits are less than those in lower orbits of hydrogen atom?

Ans 1:

Q9. What is the function of principal quantum number?

Ans 1:

Its values are whole numbers and never zero, negative or fractional. It gives us information about:

- (i) Energy of electron.
 - (ii) Distance of electron from the nucleus.
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Q10. How does Bohr introduce the Planck's quantum theory in his model?

Ans 1: Bohr proposed that electrons move around the nucleus in the fixed orbits with definite energies. Whenever, they change the orbits they emit or absorb the energy in terms of photons which was suggested by Planck.
