Atoms

Q.No.1:
Write the expression for Bohr's radius in hydrogen atom.

CBSE Board Paper 2010

Q.No.2:
(a) Using de Broglie's hypothesis, explain with the help of a suitable diagram, Bohr's second postulate of quantization of energy levels in a hydrogen atom.
(b) The ground state energy of hydrogen atom is −13.6 eV. What are the kinetic and potential energies of the electron in this state?

CBSE Board Paper 2011

Q.No.3:
(a) Using Bohr's postulates, obtain the expression for total energy of the electron in the n^{th} orbit of hydrogen atom.
(b) What is the significance of negative sign in the expression for the energy?
(c) Draw the energy level diagram showing how the line spectra corresponding to Paschen series occur due to transition between energy levels.

CBSE Board Paper 2013

Q.No.4:
(a) Using Bohr's second postulate of quantization of orbital angular momentum show that the circumference of the electron in the n^{th} orbital state in hydrogen atom is n times the de Broglie wavelength associated with it.
(b) The electron in hydrogen atom is initially in the third excited state. What is the maximum number of spectral lines which can be emitted when it finally moves to the ground state?

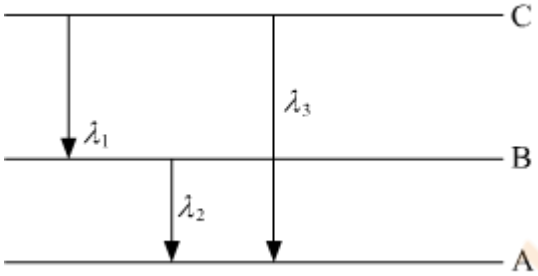
CBSE Board Paper 2012

Q.No.5: A 12.3 eV electron beam is used to bombard gaseous hydrogen at room temperature. Upto which energy level the hydrogen atoms would be excited?
Calculate the wavelengths of the second member of Lyman series and second member of Balmer series. **CBSE Board Paper 2014**

Q.No.6: Show that the radius of the orbit in hydrogen atom varies as n^2, where n is the principal quantum number of the atom. **CBSE Board Paper 2015**

Q.No.7: (i) State Bohr's quantization condition for defining stationary orbits. How does the de Broglie hypothesis explain the stationary orbits?
(ii) Find the relation between three wavelengths λ_1, λ_2 and λ_3 from the energy-level diagram shown below.

CBSE Board Paper 2016



Q.No.8: Define the distance of closest approach. An α-particle of kinetic energy 'K' is bombarded on a thin gold foil. The distance of the closest approach is 'r'. What will be the distance of closest approach for an α-particle of double the kinetic energy?

OR

Write two important limitations of Rutherford nuclear model of the atom.

CBSE Board Paper 2017

Q.No.9: (a) State Bohr's postulate to define stable orbits in hydrogen atom. How does de Broglie's hypothesis explain the stability of these orbits?
(b) A hydrogen atom initially in the ground state absorbs a photon which excites it to the n = 4 level. Estimate the frequency of the photon.

CBSE Board Paper 2018

Q.No.10: State Bohr's quantization condition of angular momentum. Calculate the shortest wavelength of the Bracket series and state to which part of the electromagnetic spectrum does it belong.