INTERNATIONAL INDIAN SCHOOL BURAIDAH

CLASS:XII SUBJECT: PHYSICS

LESSON : ATOMS AND NUCLEI

1.In the ground state of H-atom, its Bohr radius is given as 5.3 x 10-"m. The atom is excited such that the radius becomes 21.2 x 10-"m. Find (i) the value of the principal quantum number and (ii) the total energy of the atom in this excited state.

2.Calculate the de-Broglie wavelength of the electron orbiting in the n = 2 state of hydrogen atom.

3.The ground state energy of hydrogen atom is - 13.6 eV. If an electron makes a transition from an energy level - 1.51 eV to - 3.4 eV, calculate the wavelength of the spectral line emitted and the series of hydrogen spectrum to which it belongs.

4. A heavy nucleus P of mass number 240 and binding energy 7.6 MeV per nucleon splits in to two nuclei Q and R of mass numbers 110 and 130 and binding energy per nucleon 8.5 Me and 8 MeV, respectively. Calculate the energy released in the fission.

5. Draw the curve showing the variation of binding energy per nucleon with the mass number of nuclei. Using it explain the fusion of nuclei lying on ascending part and fission of nuclei lying on descending part of this curve.

6. (a) Distinguish between nuclear fission and fusion giving an example of each.

(b) Explain the release of energy in nuclear fission and fusion on the basis of binding energy per nuclear curve. (CBSE 2023)

7.(il) (a) How is the size of a nucleus found experimentally? Write the relation between the radius and mass number of a nucleus.

8. Prove that the density of a nucleus is independent of its mass number.

9. Draw a graph showing the variation of potential energy of a pair of nucleons as a function of their separation. Indicate the region in which the nuclear force is (i) attractive and (ii) repulsive.

(CBSE 2023)

10. Draw a plot of potential energy between a pair of nucleons as a function of their separation. Mark the regions where potential energy is(i) positive and (ii) negative.