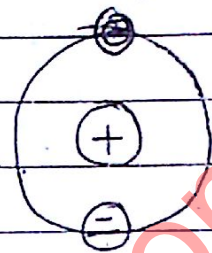


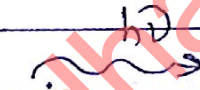
Absorption of Radiation

We know that an atom consists of a positively charged nucleus and negatively charged electrons revolve around the nucleus in a circular orbit. When energy is given to the atom, then its electrons jump from the ground energy level to the higher energy level.



Let us suppose that E_1 and E_2 are energies of lower and upper level. When a photon of frequency ν is incident on an atom, then its electron after absorbing that photon jumps from energy level E_1 to the energy level E_2 . This process is called absorption of radiation.

②



Thus the minimum energy required for the electron to jump from E_1 to E_2 is equal to the energy difference between both of the two energy levels. That is

$$E_2 - E_1 \text{ or } E_2 - E_1 = h\nu$$

Thus the probability of an electron going from state ① to ② depends upon the energy density of the photon and characteristics of state ① and ②.

Thus probability of electron going

From state ① to ② is directly proportional to the energy density $u(\nu)$ Thus

$P_{12} \propto u(\nu)$ Where P_{12} is the probability of electron going from state ① to ②.
OR

$$P_{12} = B_{12} u(\nu) \quad \text{--- ①}$$

Where B_{12} are called the proportionality constant that depends upon the characteristic of state ① and state ②