



2. Consider a hydrogen atom with its electron in the n^{th} orbital. An electromagnetic radiation of wavelength 90 nm is used to ionize the atom. If the kinetic energy of the ejected electron is 10.4 eV, then the value of n is ($hc = 1242 \text{ eV nm}$)

Answer: We know incident photon energy = Energy of electron in n^{th} State + K.E of electron

Energy of photon = Energy of electron + K.E

$$\frac{hc}{\lambda} = -\frac{13.4}{n^2} + 10.4$$

$$\text{or } \frac{1242}{90} - 10.4 = -\frac{13.4}{n^2}$$

$$\text{or } \frac{-306}{90} = -\frac{13.4}{n^2}$$

$$\text{or } n = 2$$

Answer: 2