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Lect-20

Part-I

Atomic Structere

Ques when a radiation of wavelength 331 Å strike the metal surface. Electrons are emitted with K.E. of 1.68×10^5 J mol^{-1}. Then find the work function of metal & also find the Maxm wavelength required to remone an $e^{\ominus}$

K.E = 331 Å per mol = 1.68×10^5

K.E. per = $1.68 e^{\ominus} 10^5$ = J mol

$$= \frac{1.68' \times 10^5}{6.022 \times 10^{23}}$$

$$h\nu = h\nu_0 + K.E.$$

$$\frac{hc}{\lambda} = W_0 + K.E.$$

$$\frac{6.62 \times 10^{-34} \times 3 \times 10^8}{331 \times 10^{-10}} = W_0 + \frac{1.68 \times 10^5}{6.022 \times 10^{23}}$$

$$6 \times 10^{-18} - 0.24 \times 10^{-18} = W_0$$

$$5.76 \times 10^{-18} J = W_0$$

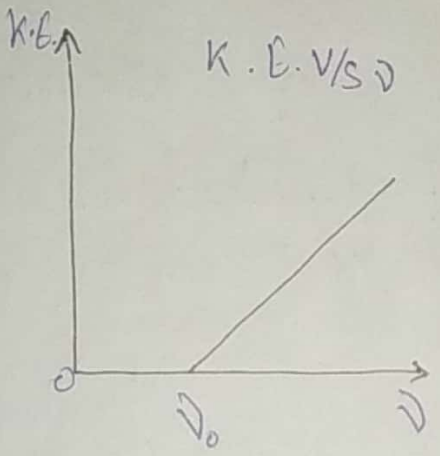
Bohr Atomic Model :—

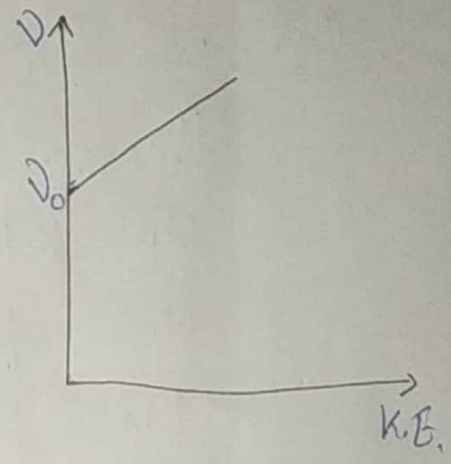
Intensity ↑ no. of photo $e^{\ominus}$ ↑

$E = W_0 + K.E.$

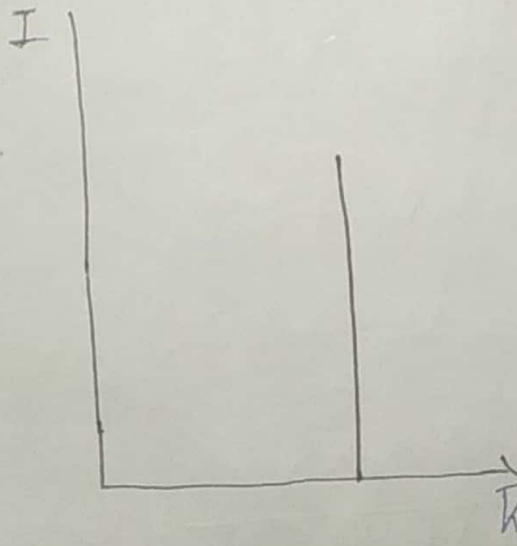
$$\boxed{h\nu = h\nu_0 + K.E.}$$

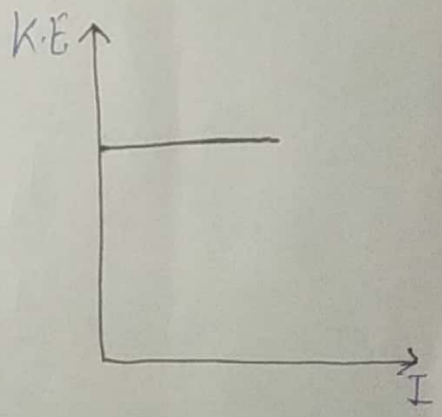
$$h\nu = h\nu_0 + \frac{1}{2} m_e v^2$$





K.E. V/S Intensity (I)





Ques Which of the following angular momentum shows presence of $e^{\ominus}$ in an orbit.

① $\frac{h}{2\pi}$ ② $\frac{3h}{2\pi}$ ③ $\frac{5h}{\pi}$ ④ $1.5\,\frac{h}{2\pi}$

⑤ $\frac{7h}{4\pi}$ ⑥ $1.25\,\frac{h}{\pi}$ ⑦ $3.5\,\frac{h}{2\pi}$ ⑧ $2.5\,\frac{h}{\pi}$

$\frac{25}{10}\ 5$

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⑨ $0.5\,\frac{h}{\pi}$

$\frac{1}{2}\,\frac{h}{\pi}$

Ques If angular momentum for H (n=1) is x then find angular momentum for Li^{+2} (n=1)

① x ② $x/3$ ③ $3x$ ④ $3x/2$

$$J_H = \frac{nh}{2\pi} = x$$

$$\frac{h}{2\pi} = x$$