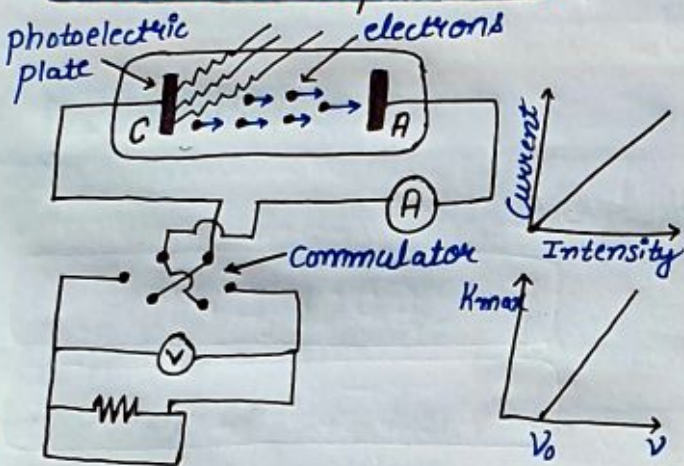


Dual Nature Of Matter and Radiation...

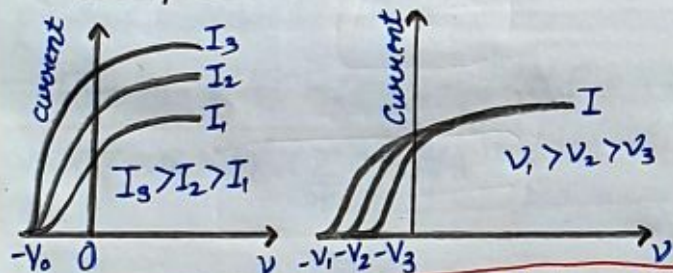
Photoelectric Effect:

- When light of sufficient small wavelength is incident on a metal surface, electrons are ejected.
- Electrons are called photo-electrons.
- Minimum energy required to bring an electron out of the surface is work function

Photoelectric Experiment:



Graphs:



- Same frequency
- different intensity
- different frequency
- same intensity

Einstein's Explanation:

$$E = K_{max} + \phi$$

OR

$$\phi = \frac{hc}{\lambda_0}$$

$$K_{max} = E - \phi = eV_0$$

$$\phi = h\nu_0$$

$$K_{max} = h\nu - h\nu_0$$

- If $\lambda > \lambda_0$ i.e. $E < \phi$ → no electron will come out.

Wave Nature:

$$\lambda = \frac{h}{p} = \frac{h}{mv}$$

principle of Uncertainty →

$$\Delta x \Delta p \geq \frac{h}{4\pi}$$

For a photon -

$$p = \frac{h\nu}{c} \Rightarrow \frac{h}{p} = \frac{c}{\nu} = \lambda$$

For an electron -

$$K = eV = \frac{p^2}{2m}$$

$$p = \sqrt{2mK} = \sqrt{2meV}$$

$$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mK}} = \frac{h}{\sqrt{2meV}}$$

$$\lambda = \frac{1.227}{\sqrt{V}} \text{ nm}$$



NEET
SLAYER