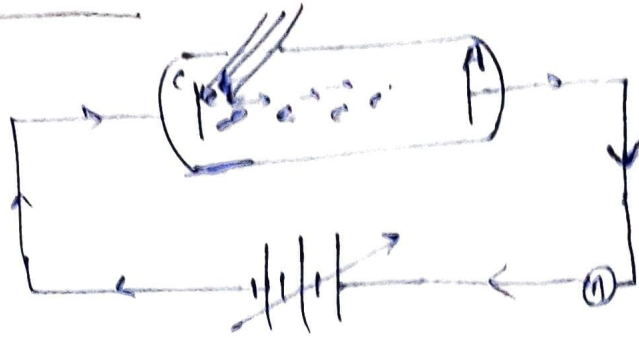


Photocurrent :-



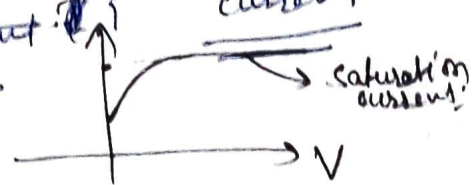
Now Voltage $\uparrow \Rightarrow$ photocurrent inc.:

$\uparrow \Rightarrow \uparrow$

$\uparrow \Rightarrow \text{const}$

so & that current is called Saturation current

Photocurrent



Again

Voltage $\downarrow \Rightarrow$ photocurrent \downarrow

$\downarrow \Rightarrow \downarrow$

$\downarrow \Rightarrow 0$

that,

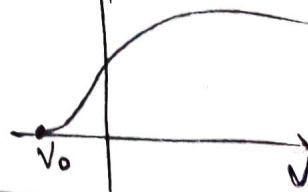
Voltage is called i_p

Stopping potential

$$eV_0 = K_{max}$$

$$V_0 = \frac{K_{max}}{e} \Rightarrow$$

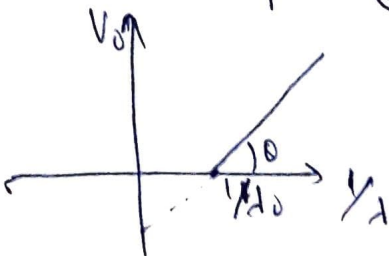
$$\frac{E}{e} - \frac{\phi}{e} = V_0$$



V_0 depends on

(i) λ & f

(ii) ϕ



$$\frac{hc}{\lambda e} - \frac{\phi}{e} = V_0$$

$$\tan \theta = \frac{hc}{e}$$

Dual Nature of Radiation & Matter:-

→ mass of photon cannot be defined. The rest mass of photon called ~~quanta~~ is equal to zero.

→ energy of each photon:-

$$E = \frac{hc}{\lambda} = hf$$

$$\textcircled{*} E = \frac{1240 \text{ eV-nm}}{\lambda (\text{nm})}$$

→ momentum:-

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

$$h = 6.626 \times 10^{-34} \text{ J s}$$

$\textcircled{*}$ All photons have same energy & same speed in all frame. \Rightarrow 'V' of photon $= c = 3 \times 10^8 \text{ m/s}$

→ photoelectric effect:- when light of low wavelength or high frequency incident on metal surface, e^- are ejected from metal surface.

$\textcircled{*}$ The collision of a photon with a material particle is assumed as perfectly elastic collision

$$\begin{aligned} \vec{p}_i &= \vec{p}_f \\ \vec{k} \cdot \vec{r}_i &= \vec{k} \cdot \vec{r}_f \end{aligned}$$

$\textcircled{*}$ if Intensity of light of given wavelength is increased then no. of photon will increase but energy of each photon is still same.

$$E = \frac{hc}{\lambda}$$

work function:- min. energy required to remove a surface e^- is called work function.

Dual Nature of Radiation & Matter:-

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→ energy of each photon:-

$$E = \frac{hc}{\lambda} = hf$$

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