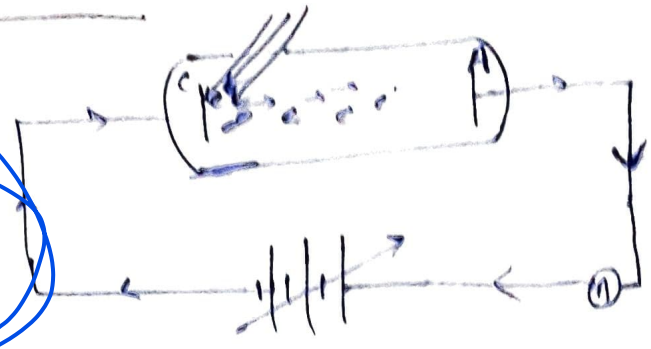
Photocurrent :-



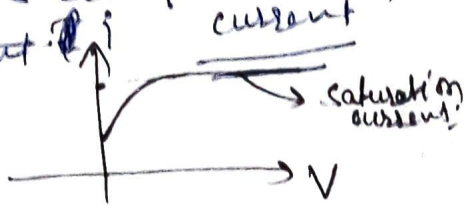
Now. Voltage ↑ ⇒ photo current inc.:

↑ ⇒ ↑

↑ ⇒ const

& that current is called Saturation current

~~Photocurrent~~



Again

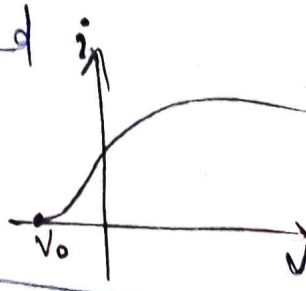
Voltage ↓ ⇒ photo current ↓

↓ ⇒ ↓

↓ ⇒ 0

that. Voltage is called

Stopping potential

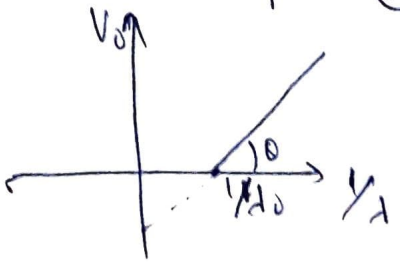


$eV_0 = K_{max}$

$V_0 = \frac{K_{max}}{e} \Rightarrow \boxed{\frac{\epsilon}{e} - \frac{\phi}{e} = V_0}$

V_0 depends on

(i) λ & f (ii) ϕ



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

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

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 :-

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

(*) $E = \frac{1240 \text{ ev-nm}}{\lambda \text{ (in nm)}}$

→ momentum :-

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

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

(*) All photons have same energy & same speed in all frame. ⟹ 'v' of photon = $c = 3 \times 10^8$ m/s

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

(*) The collision of a photon with a ~~p~~ material particle is assumed as perfectly elastic collision

$$\boxed{\begin{aligned} \vec{P}_i &= \vec{P}_f \\ K \cdot \hat{c}_i &= K \cdot \hat{c}_f \end{aligned}}$$

(*) if Intensity of light of given wavelength is increased then no. of photon will increase but energy of each photon is still same.

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

work function :- Min. energy required to remove a surface $e^{\ominus}$ is called work function.

Dual Nature of Radiation & matter :-

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

→ energy of each photon :-

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

(*) $E = \frac{1290 \text{ ev-nm}}{\lambda \text{ (in nm)}}$

→ momentum :

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

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

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

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