Photo Electric Effect

Course on Atomic Structure for Class XI

akhilesh • Lesson 9 • Sept 8, 2021

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▲ 35 • Asked by Kavya

Charansparsh sir, last class me net chala gaya tha to wish nahi kar paya. Happy teachers day sir, mene apne hato se banaya hai :)

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▲ 5 • Asked by Prathmesh

SIR KUCH ISSUES KE CHALTE LIVE NHI AA PA RHA THA BUT ROZ RAAT KO CLASSES DEKH LETA THA. NOW EVERYTHING IS FINE , I WILL BE LIVE AND REGULAR FROM NOW ONWARDS , CHARAN SPARSH SIR :))

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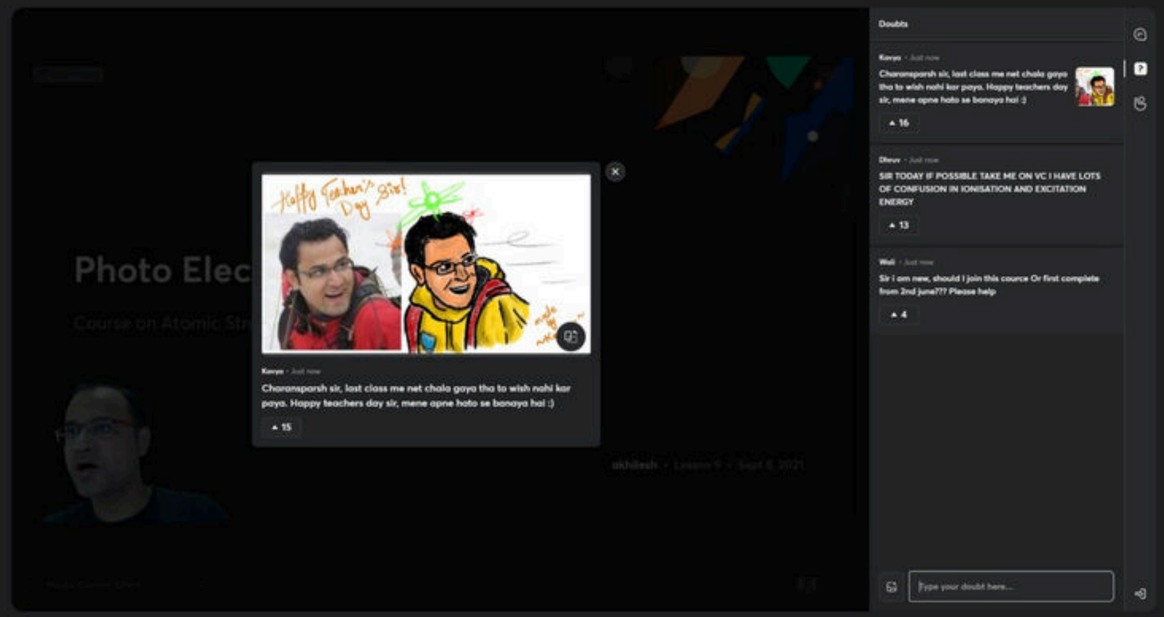
▲ 24 • Asked by Ridham

HAMARE PAS BHI AISI SCREEN AA GAYI DBT KI



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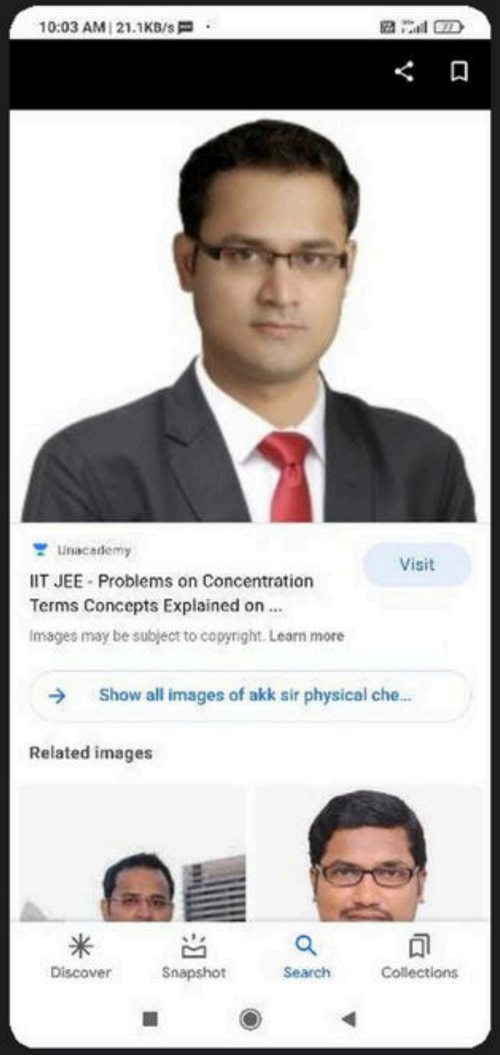
▲ 2 • Asked by Ankit Kuma...

Take me on vc

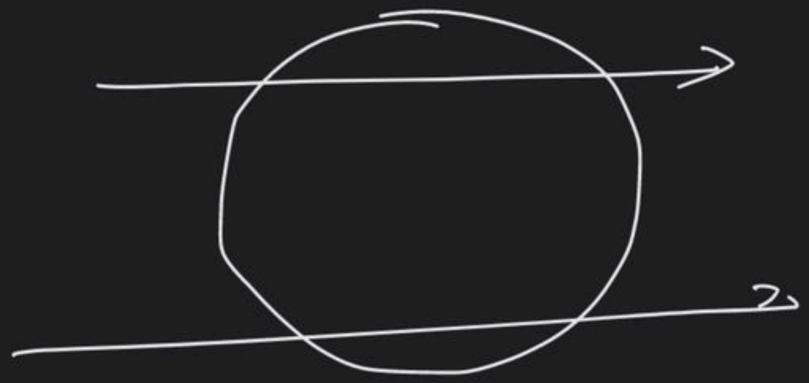


(1) $R = R_0 (A)^{1/3}$ By Rutherford

Radius of nucleus

1.33×10^{-15}

mass number

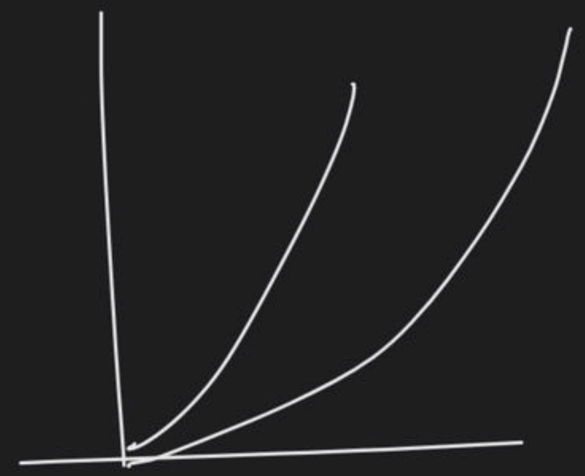


Liquid drop Model

H He^{+} Li^{2+}

(2) A) T
B) F
C) T
D) F

3×10^{8}



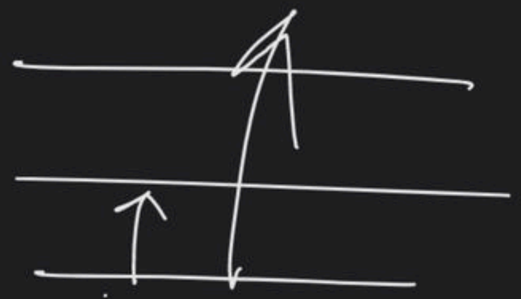
$-\frac{E}{n^2}$

24eV

$\left(-E\right) - \left(-\frac{E}{4}\right) = 24$

Potential volt eV

$\frac{3E}{4} = 24$



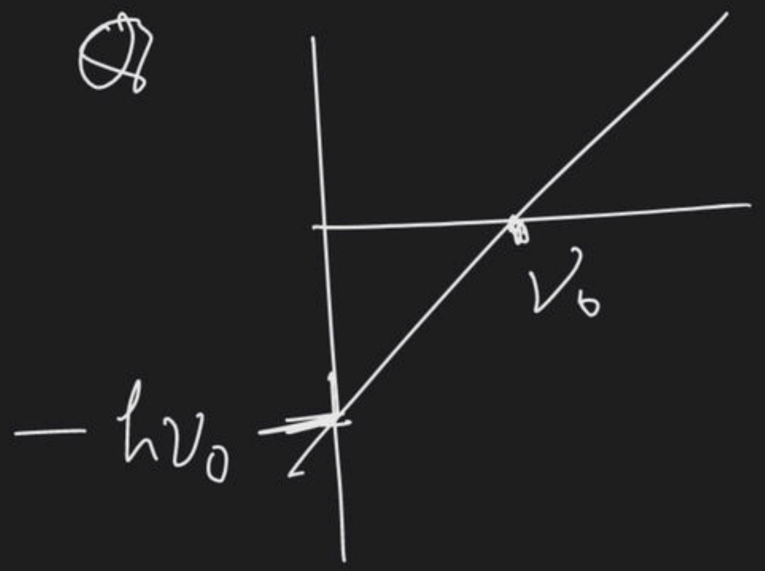
$E = 32$

4

5 with sign

8

a

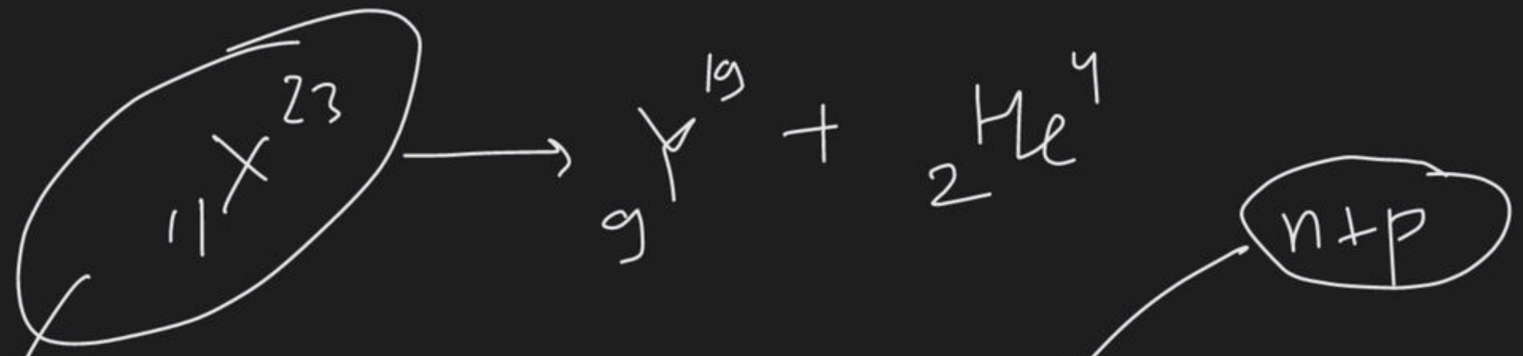


(a) $Li \longrightarrow Li^{3+} + 3e^-$

$IE_1 + IE_2 + IE_3 = 19800$

$= 520$

(10)

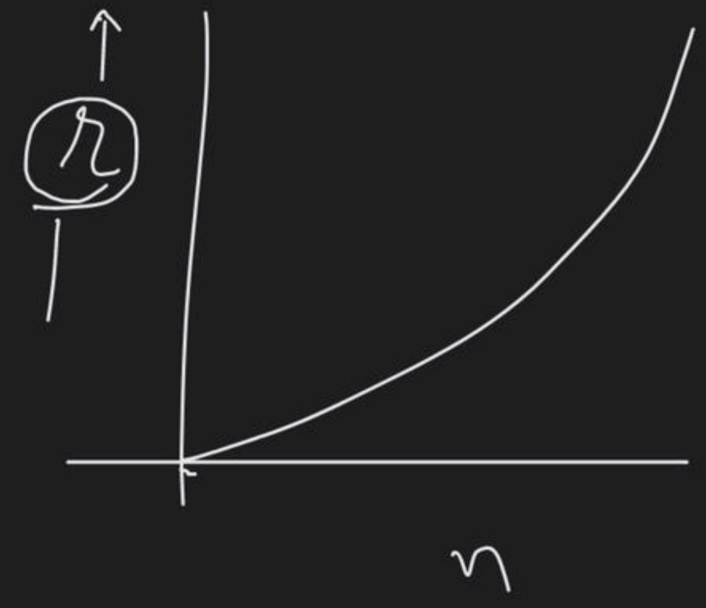


$\frac{4.6}{23} = 0.2 \text{ mol}$ no. of p

0.2×12 mol neutron


7
6
5
4
3
3D

(B)



$$r = 0.529 \frac{n^2}{Z}$$

$$y = x^2$$

$$PE = -2 \times 13.6 \frac{Z^2}{n^2}$$

$$PE = -2 \times 13.6 Z^2 \left(\frac{1}{x}\right)^2$$

photocurrent

100 photons

(A) frequency only

(B) Number of only photon

(C) both

(D) None of these

photocurrent depends on photointensity and is independent of frequency

Q. A 100 W bulb emits light of $\lambda = 6620\ A^\circ$ only. If all these photons are allowed to strike a metal plate of $W = 1\ eV$ find photo current. (amp)

A) $\frac{160}{3}$ amp

B) $80/3$ amp

C) $320/3$ amp

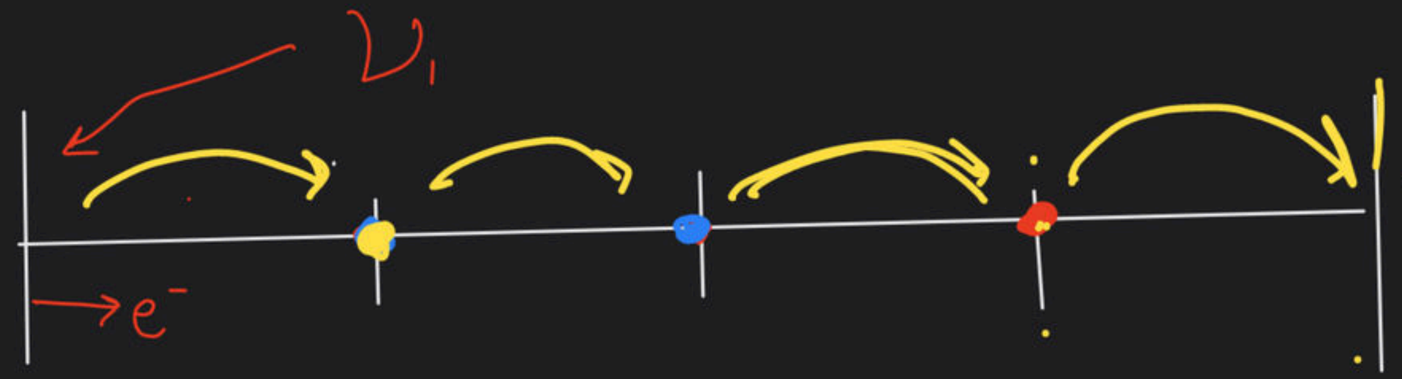
D) None

$$E = \frac{hc}{\lambda} = \frac{6.62 \times 10^{-34} \times 3 \times 10^{8}}{10^{3} \; 6620 \times 10^{-10}}$$

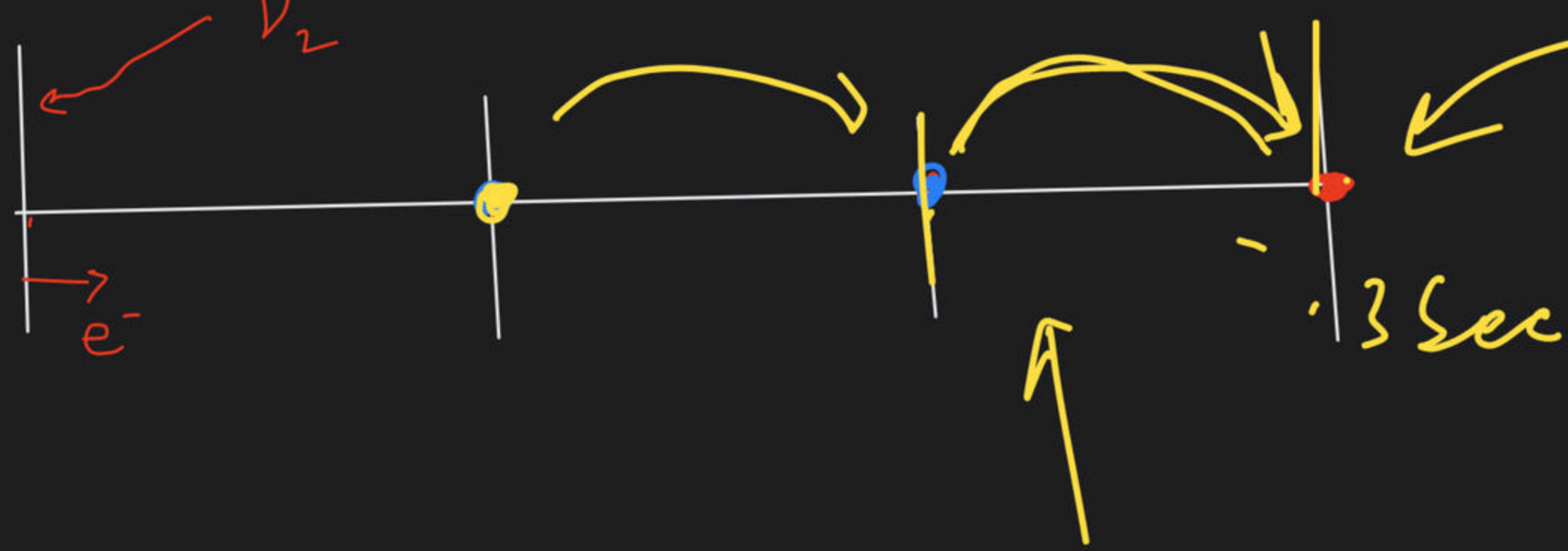
$$E = 3 \times 10^{-19} \; J \longleftarrow$$

$$E = \frac{100}{3 \times 10^{-19}} = \boxed{\frac{10^{21}}{3}}$$

$$= \left(\frac{1}{3} \times 10^{21}\right) \times 1.6 \times 10^{-19}$$



$v_2 > v_1$



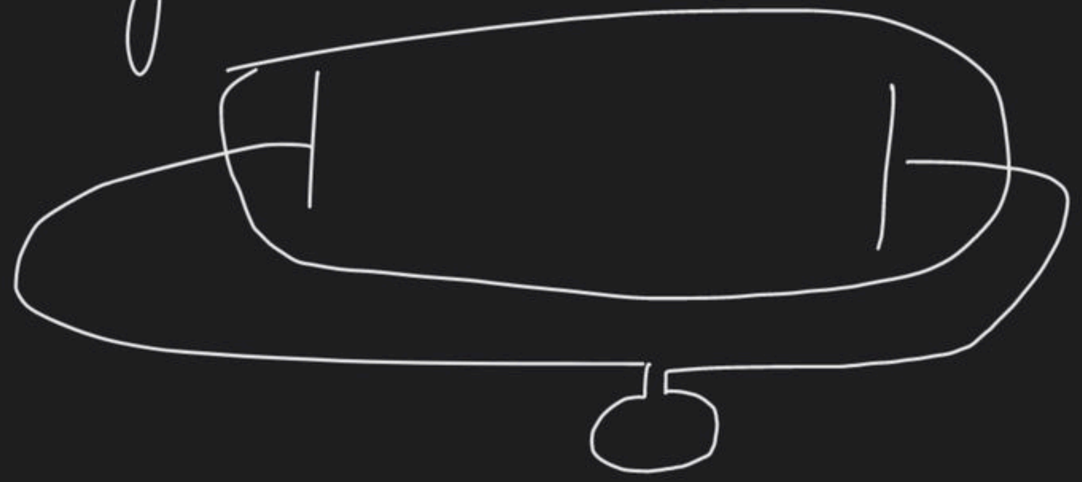
$t = 0$

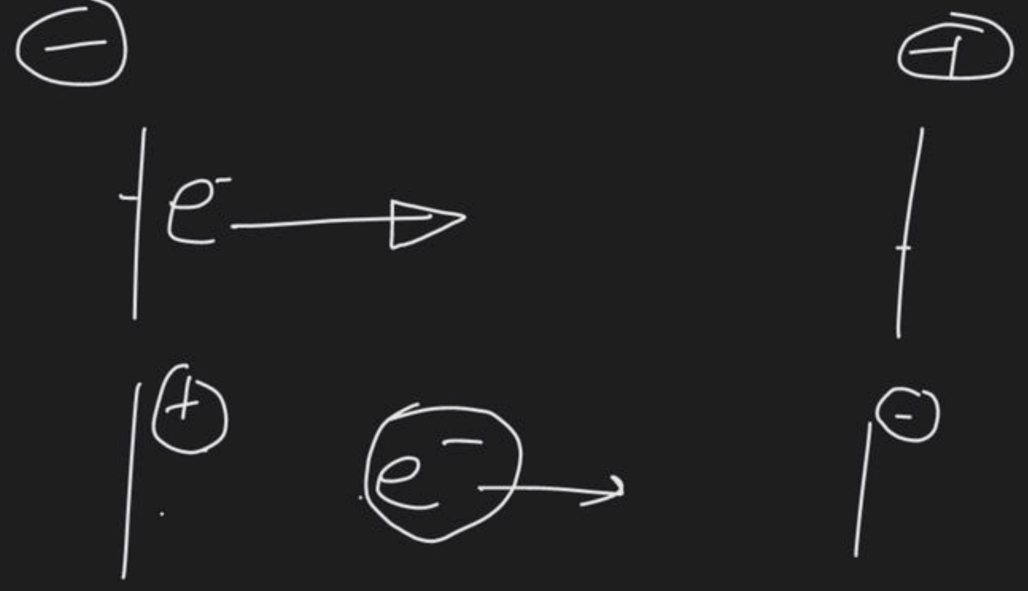
$t = 1$ Sec

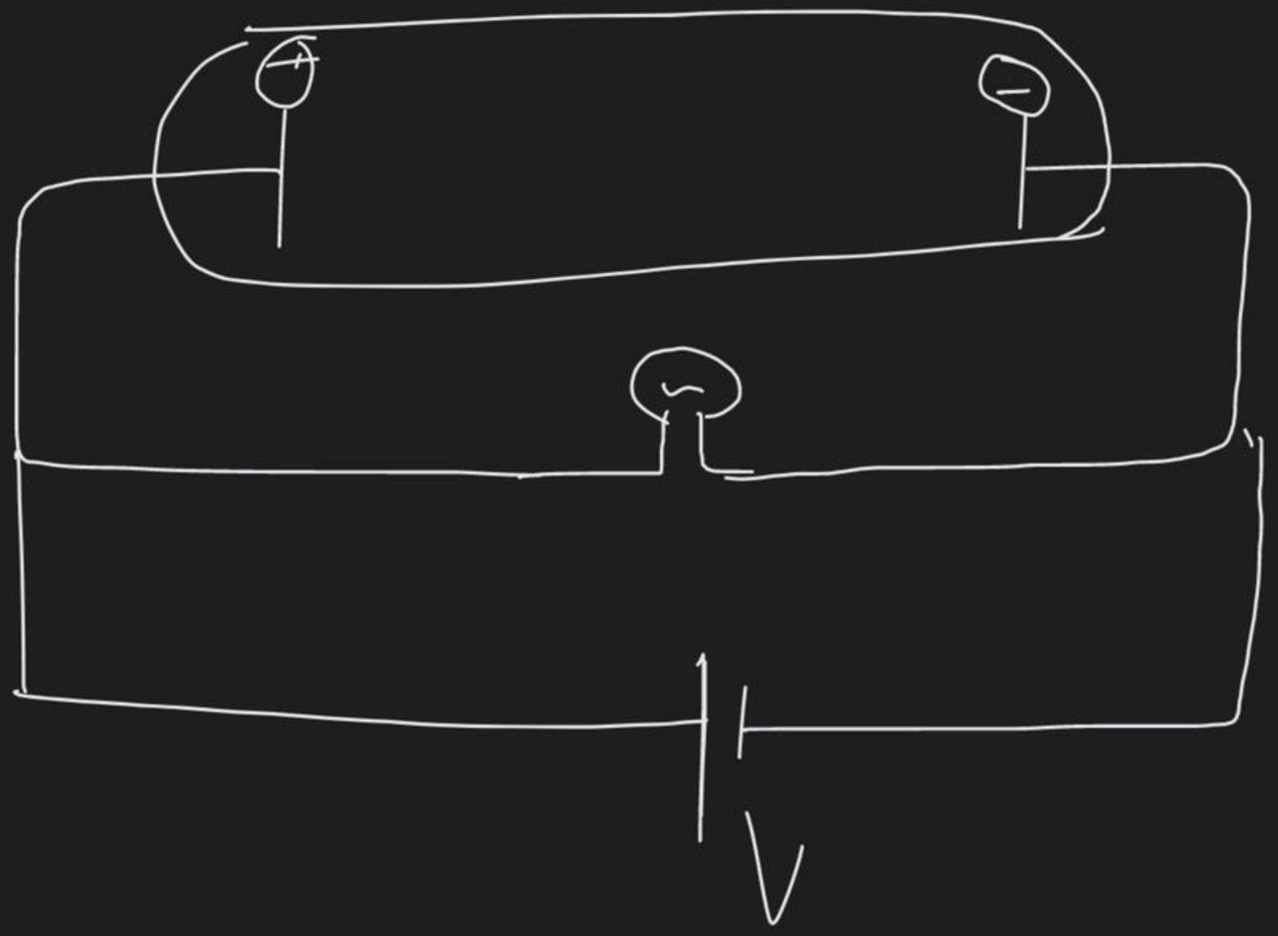
$t = 2$ Sec

stopping potential :→ (V_0)

minimum potential required to stop photocurrent completely is called stopping potential






+
−
V
-ive potential

$KE = eV$

6 volt

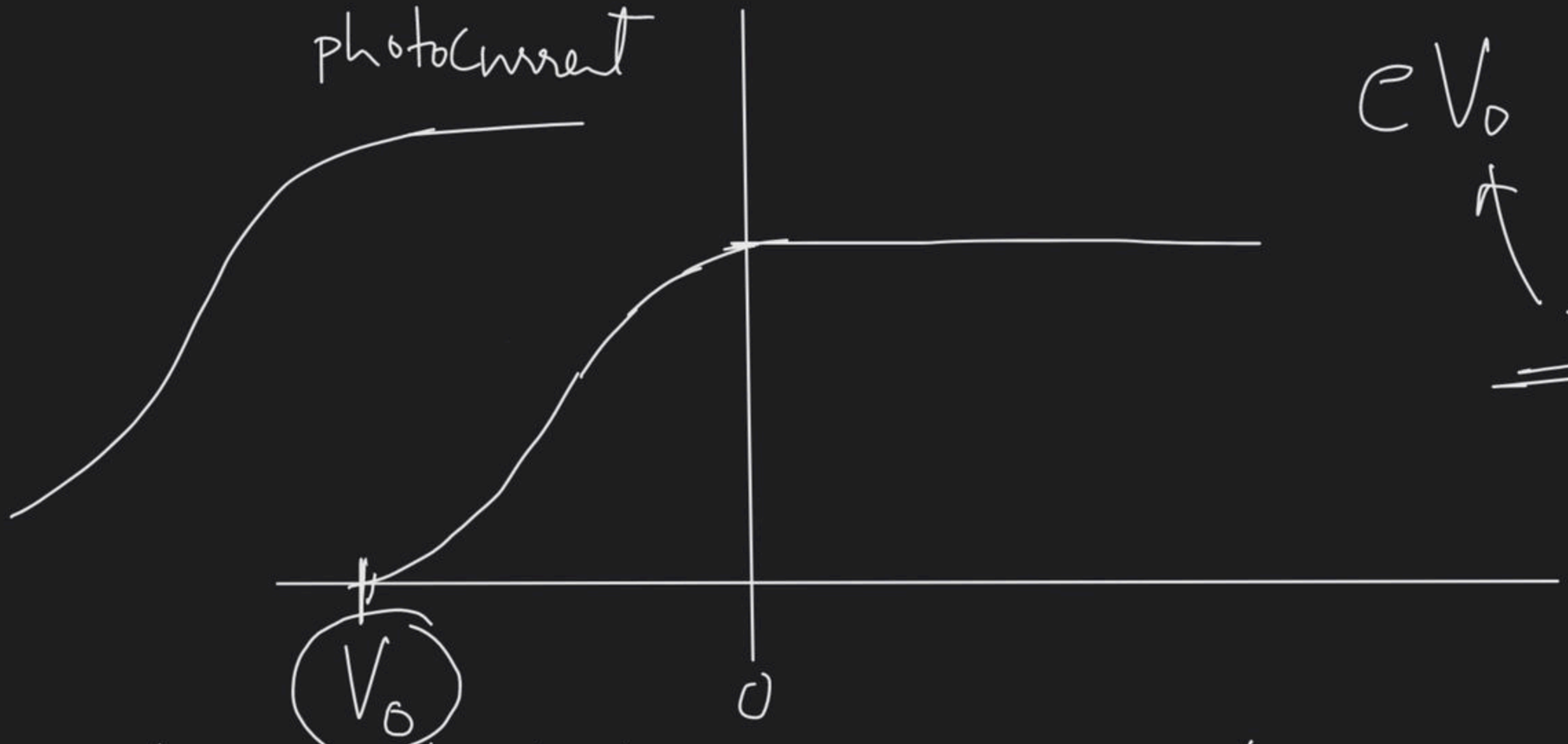
5 volt

$6\,eV = KE_{max} = h\nu - \phi$

$$KE_{max} = qV_0 = eV_0$$

$$5eV = eV_0$$

$$\underline{5\,\text{volt}} = V_0$$



$eV_0 = KE_{max}$

↑ frequency

-ive potential

accelerating

$$eV_0 = KE_{max} = h\nu - h\nu_0$$

KE_{max}
i
V_0

frequency

photo intensity

$$\frac{\eta}{4\pi R^2} \times \pi r^2$$

$$0 \quad \pi r^2$$

A 60W source of light emits light spherically in all direction of $\lambda = 6620\,\text{Å}$. If all these photons are allowed to strike a sphere of radius 1cm kept at 5 km distance. find no photons striking the sphere per sec.

A) 5×10^8

C) 5×10^6

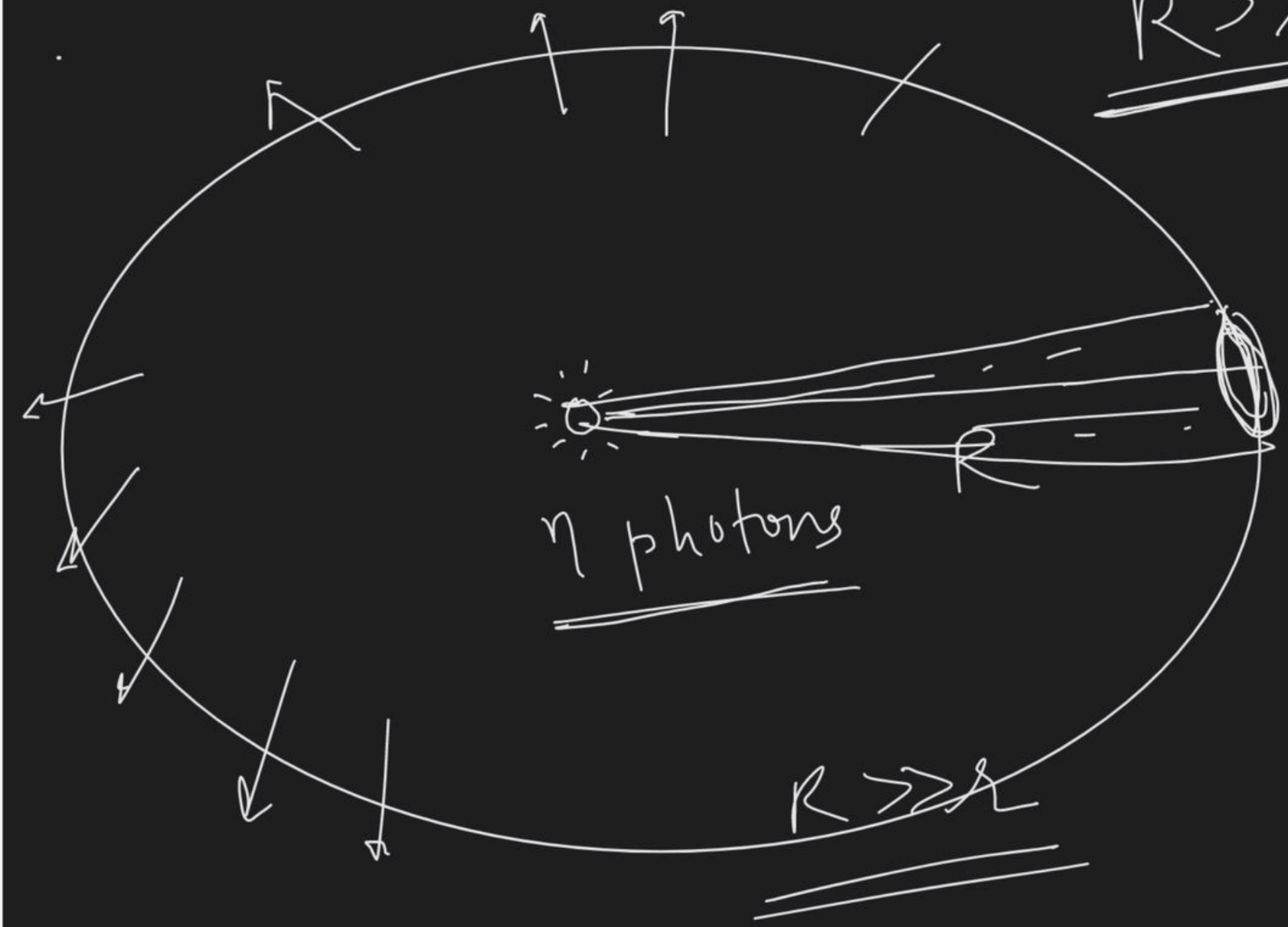
B) 2×10^8

D) 2×10^6

S-1 40-45

6-1 36-41

S-2 9-13



$4\pi R^2$

$$\frac{\eta}{4\pi R^2} \times \pi r^2$$

1 Lit/Sec

1 Lit/Sec