Sheet $\boxed{4}$

$\boxed{1}$ $I = 10\% I_o$

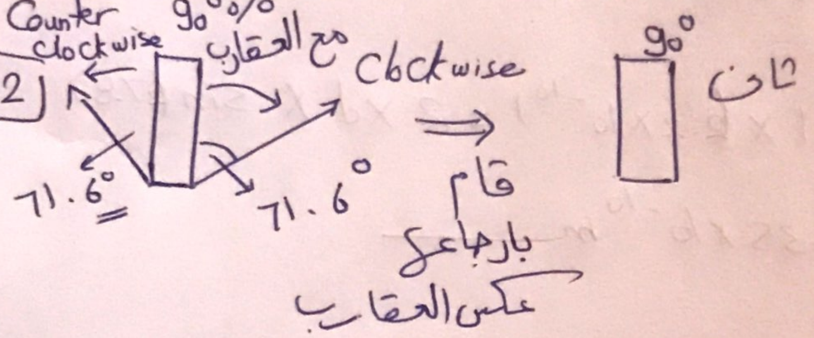
$$\therefore I = I_o \cos^2\theta$$

$$\frac{10}{100}\cancel{I_o} = \cancel{I_o}\cos^2\theta$$

$$\therefore \cos\theta = 0.3$$

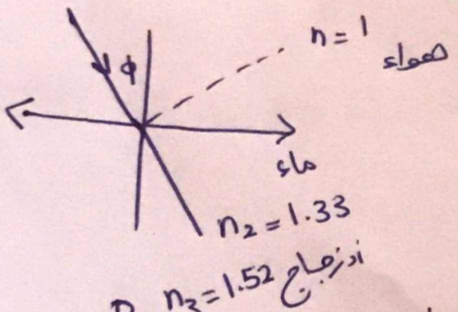
$$\therefore \theta = 71.5^\circ$$

$\boxed{2}$



$$\therefore I = 0.1 I_o$$

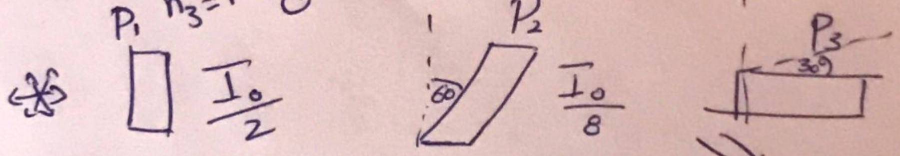
$\boxed{3}$



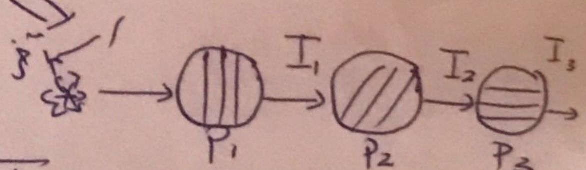
$$\therefore \tan\theta_p = \frac{n_2}{n_1} = \frac{1.33}{1} \quad \therefore \theta_p = 53.12^\circ$$

$$\therefore \tan\theta_p = \frac{n_3}{n_1} = \frac{1.52}{1} \quad \therefore \theta_p = 56.65^\circ$$

$\boxed{4}$



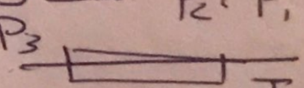
$$I_1 = I_o \cos^2\theta \Rightarrow I_1 = \frac{I_o}{2}$$



$$I_2 = I_1\cos^2\theta = \frac{I_o}{2}\cos^2(60) = \frac{I_o}{8}$$

ازالة P_1 ، P_2

$$I_3 = I_2\cos^2\theta = \frac{I_o}{8}\cos^2(90) = 0$$

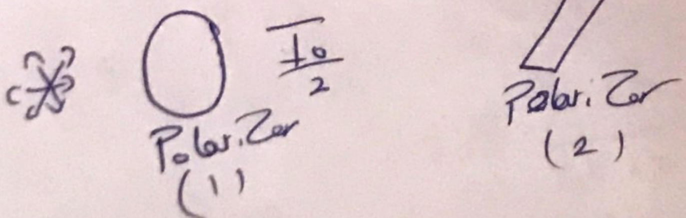


$\boxed{P_1 \text{ مع } 90}$ الفكرة

اصلاح I_3

$$I_3 = I_2\cos^2\theta = \frac{I_o}{8}\cos^2(30) = \frac{3I_o}{32}$$

$\boxed{5}$



$$I = I_o\cos^2\theta$$

$$= \frac{I_o}{2}\cos^2(90-3)$$

$$= 2.739\times10^{-3}\, I_o$$

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$\boxed{6}$ $I = \frac{10}{100} I_o$ $\therefore$ $I = I_o \cos^2\theta$

$\frac{10}{100} I_o = \frac{I_o}{2} \cos^2\theta$ $\theta =$

$\boxed{7}$ $m\lambda = 2d \sin\theta$

$(2)(0.07\times10^{-9}) = 2\times \underset{0.2\times10^{-9}}{d} \times \sin(\theta)$ $\therefore \theta = 20.7^\circ$

$\boxed{8}$ $m\lambda = 2d\sin\theta$ $\therefore$ $1\times(2.2\times10^{-10}) = 2\times d \times \sin(27.8)$

$\therefore d = 2.35\times10^{-10}\,m$

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$h = 6.625 \times 10^{-34}$
$C = 3 \times 10^{8}$
$e = 1.6 \times 10^{-19}$
$m = 9.1 \times 10^{-31}$

sheet (5)

$K_{max} = \frac{1}{2} m v^2$ or $= e\bar{V}$

$f = \frac{c}{\lambda}$

1

$$\boxed{hf = K_{max} + \phi}$$

$$(6.625 \times 10^{-34})\left(\frac{c}{\lambda}\right) = eV_{stop} + \phi$$

$$(6.625 \times 10^{-34})\left(\frac{3 \times 10^{8}}{\lambda}\right) = (1.6 \times 10^{-19})(5) + (2.2 \times 1.6 \times 10^{-19})$$

$$\therefore \lambda = 1.7 \times 10^{-7}\, m$$

2

$$K_{max} = hf - \phi$$

$$= (6.625 \times 10^{-34})(3 \times 10^{15}) - (2.3 \times 1.6 \times 10^{-19})$$

$$= 1.6 \times 10^{-18}\, J$$

3

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

$$E = \frac{1}{2} m v_{max}^2 + \phi$$

$$v = \sqrt{\frac{E - \phi}{0.5\, m}} = \sqrt{\frac{(5.8 \times 1.6 \times 10^{-19}) - (4.5 \times 1.6 \times 10^{-19})}{0.5 \times 9.11 \times 10^{-31}}}$$

$$= 6.76 \times 10^{6}\, m/s$$

4 Visible light (400 - 700nm)

$$\therefore E = h\nu = h\frac{c}{\lambda}$$

$$= (6.625 \times 10^{-34})\frac{(3 \times 10^{8})}{400 \times 10^{-9}}$$

$$= 4.96 \times 10^{-19} = \frac{4.96 \times 10^{-19}}{1.6 \times 10^{-19}}$$

$$= 3.1\, eV$$

$\phi_{Tan} = 4.2\, eV$

$\phi_{Tun} = 4.5\, eV$

$\phi_{Al} = 4.2\, eV$

$\phi_{ba} = 2.5\, V$

$\phi_{Li} = 2.3\, eV$

which E must be more than ϕ to eject electron

So choose $\boxed{\phi_{Ba} \text{ and } \phi_{Li}}$

$\boxed{5}$

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

$$h\frac{c}{\lambda} = eV_{stop} + \phi$$

$$\therefore V_{stop} = \left(h\frac{c}{\lambda} - \phi\right) / e$$

$$= \frac{\left[\frac{(6.625\times10^{-34})(3\times10^{8})}{(400\times10^{-9})} - (1.8\times1.6\times10^{-19})\right]}{(1.6\times10^{-19})}$$

$$= 1.3\,V$$

eV

$$\therefore K_{max} = \frac{1}{2}mv^2$$

$$\therefore v = \sqrt{\frac{2eV}{m}} = \sqrt{\frac{2\times1.6\times10^{-19}\times1.3}{9.1\times10^{-31}}}$$

$$= 6.76\times10^{5}\,m/s$$

حل آخر ← ثم نعوض المعادلة

$$h\frac{c}{\lambda} = \frac{1}{2}mv^2 + \phi$$

$$v^2 = \left(h\frac{c}{\lambda} - \phi\right) / 0.5m$$

$$v = \sqrt{\text{الكلام دا}}$$

Sheet 6

1 :- $\Delta t = \dfrac{\Delta t_o}{\sqrt{1-(\frac{v}{c})^2}} = \Delta t_o\, 8 = \dfrac{3}{\sqrt{1-(\frac{0.96c}{c})^2}} = 10.7\,sec$

2 :- $L = L_o\sqrt{1-\beta^2}$ $\therefore L^2 = L_o^2(1-\beta^2)$ $\therefore \beta^2 = 1-(\frac{L}{L_o})^2$

$= 1-(\frac{1}{2})^2 = \frac{3}{4}$ $\therefore \beta = \sqrt{\frac{3}{4}}$

3 :- $L = \dfrac{L_o}{\sqrt{1-(\frac{v}{c})^2}} = \dfrac{130}{\sqrt{1-(\frac{0.74c}{c})^2}} = 193.27\,m$

4 :- $\Delta t_o = \dfrac{X}{V} = \dfrac{26c}{0.99c} = 26.2\,y$

$\Delta t = \dfrac{\Delta t_o}{\sqrt{1-(\frac{v}{c})^2}} = \dfrac{26.2}{\sqrt{1-(\frac{0.99c}{c})^2}} = 185.7\,s$

5 :- $\Delta t = \dfrac{\Delta t_o}{\sqrt{1-(\frac{v}{c})^2}} = \dfrac{5}{\sqrt{1-(\frac{30}{3\times10^8})^2}} = 5\,s$

6 :- $L = \dfrac{8\,Ly}{8} = \dfrac{L_o}{8} = 8\,Ly\sqrt{1-(\frac{0.8c}{c})^2} = 4.8\,Ly$

$\Delta t = \dfrac{L}{v} = \dfrac{4.8\,Ly}{0.8c} = \dfrac{4.8\,Ly}{0.8(1\,\frac{Ly}{y})} = 6\,y$

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