

34

$$\lambda = 6600 \text{ nm} = 6600 \times 10^{-9} \text{ m} = 6 \times 10^{-6} \text{ m}$$

$$\lambda' = ?$$

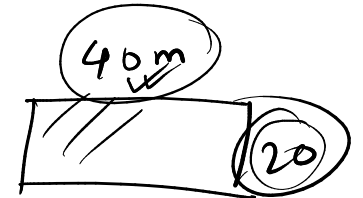
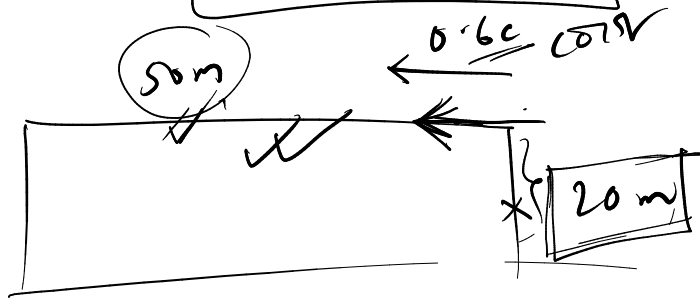
$$\phi = 150^\circ$$

$$\lambda - \lambda' = \frac{h}{m_0 c} (1 - \cos \phi)$$

$$6 \times 10^{-6} - \lambda' = \frac{6.63 \times 10^{-34}}{9.1 \times 10^{-31} \times 3 \times 10^8} (1 - \cos 150^\circ)$$

comet → comet
c

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

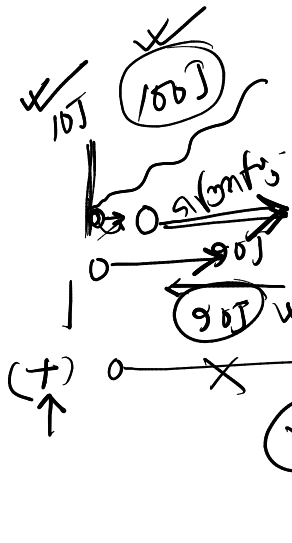


$$A = 800 \text{ m}^2$$

$$l_0 = 50$$

$$v = 0.6c$$

$$l = l_0 \sqrt{1 - v^2/c^2} = 50 \sqrt{1 - (0.6)^2} = 50 \sqrt{0.64} = 50 \times 0.8 = 40$$



$$150 \text{ J} = (10 + 90)$$

$$\text{work done by } F = \frac{W}{\text{distance}}$$

$$W = \sqrt{q}$$

$$50 \times 0.8 = 40$$

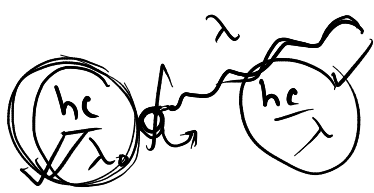
$$q = 1.6 \times 10^{-19} \text{ C}$$

$$90 = \sqrt{q} \times 1.6 \times 10^{-19}$$

$$\sqrt{q} = \frac{90}{1.6 \times 10^{-19}}$$

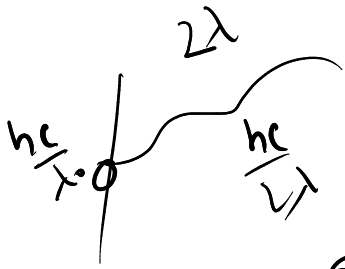
$$150 \text{ J} = \sqrt{q}$$

2



$$\text{stop freq } 1830 = 1.6 \text{ eV}$$

$$\text{stop freq} = \underline{\underline{e \times 1.6}}$$



$$4.8 \text{ V} \\ \text{stop freq} = 4.8 \text{ e}$$

$$\frac{hc}{\lambda} = \left(\frac{hc}{\lambda_0} \right) + \frac{1.6 \times e}{\lambda} \\ \frac{hc}{\lambda} - \frac{hc}{\lambda_0} = 1.6 \text{ e} \quad \text{--- (I)}$$

$$\frac{hc}{2\lambda} = \frac{hc}{\lambda_0} + 4.8 \text{ e}$$

$$\frac{hc}{2\lambda} - \frac{hc}{\lambda_0} = \frac{4.8 \text{ e}}{\lambda} \quad \text{--- (II)}$$

$$\text{(I)} \div \text{(II)}$$

$$\frac{\frac{hc}{\lambda} - \frac{hc}{\lambda_0}}{\frac{hc}{2\lambda} - \frac{hc}{\lambda_0}} = \frac{1.6 \text{ e}}{4.8 \text{ e}} = \frac{1}{3}$$

$$3 \left(\frac{1}{\lambda} - \frac{1}{\lambda_0} \right) = 1 \left(\frac{1}{2\lambda} - \frac{1}{\lambda_0} \right)$$

$$\frac{3}{\lambda} - \frac{3}{\lambda_0} = \frac{1}{2\lambda} - \frac{1}{\lambda_0}$$

$$\frac{3}{\lambda} - \frac{1}{2\lambda} = \frac{3}{\lambda_0} - \frac{1}{\lambda_0}$$

$$\frac{6-1}{2\lambda} = \frac{2}{\lambda_0}$$

$$\frac{5}{2\lambda} = \frac{2}{\lambda_0}$$

$$\boxed{\frac{5}{4} = \frac{\lambda}{\lambda_0}}$$

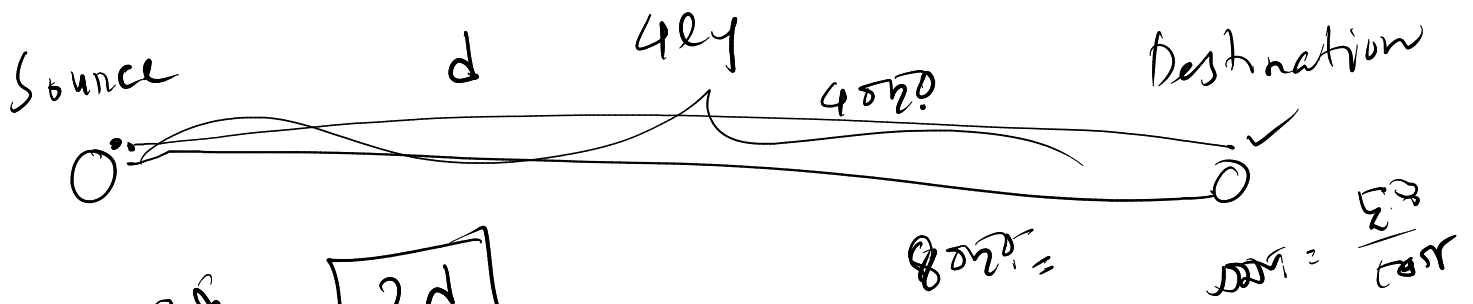
①

1 ବାଲିର ଡ଼ି
 ୫୦୧୦ କିମି

$$\frac{\text{ଦୂରତା 1 ଡ଼ିରୁ ପ୍ରାୟ ୫୦୧୦ କିମି}}{\text{ଆଲୋକ ମା.}}$$

$$= 1 \text{ year} \times \underline{c} \text{ velocity}$$

$$= (365 \times 24 \times 60 \times 60 \text{ s} \times 3 \times 10^8 \text{ m/s})$$



ଆଲୋକ ୫୦୧୦ = 2d

$$v = 0.9c$$

(୧) ଆଲୋକ ୨ଟି ଆଲୋକ 2d
 ସମୟ $t_0 = \frac{2d}{v}$

ସମୟ କିମି

$$t = \frac{t_0}{\sqrt{1 - v^2/c^2}}$$

$$= \frac{8.88}{\sqrt{1 - (0.9c/c)^2}} = 20.37 \text{ years}$$

$$= \frac{84 \text{ km} \times 8}{0.9c} = 8.88 \text{ years}$$

ସମୟ ପାର୍ଥକ୍ୟ = $(20.37 - 8.88) \text{ years}$
 $= 11.49 \text{ years}$