

Question 3. Consider a metal exposed to light of wavelength 600 nm. The maximum energy of the electron doubles when light of wavelength 400 nm is used. Find the work function in eV.

Solution:

From Einstein's photoelectric eqⁿ -
 $\frac{hc}{\lambda_1} = \phi + K_1$ (i) & $\frac{hc}{\lambda_2} = \phi + K_2$
 $\rightarrow \frac{hc}{\lambda_2} = \phi + 2K_1$ (iii) [$K_2 = 2K_1$]
2 eq (i) - eq (iii)
 $hc \left(\frac{2}{\lambda_1} - \frac{1}{\lambda_2} \right) = \phi$