2. In Young's double slit experiment using monochromatic light of wavelength λ, the intensity of light at a point on the screen where path difference is λ, is K units. Find out the intensity of light at a point, where path difference is $\frac{\lambda}{3}$.

Sol. The intensity of light is given by

$I = 4I_0 \cos^2 \frac{\phi}{2}$

i. When path difference is λ : A path difference of λ is equivalent to a phase difference of 2π.
$\therefore I = 4\ I_0 \cos^2 \pi = 4\ I_0\ (-1)^2 = 4\ I_0 = K$

ii. When path difference is $\frac{\lambda}{3}$: A path difference of $\frac{\lambda}{3}$ is equivalent to a phase difference of $\frac{2\pi}{3}$.
$\therefore I' = 4\ I_0 \cos^2 \frac{\pi}{3} = 4\ I_0\ (\frac{1}{2})^2 = I_0 = \frac{K}{4}$