Intensity distribution of fringes

We have used during interference of waves between two sources

$$A^2 = a_1^2 + a_2^2 + 2a_1a_2\cos\delta$$

If $a_1 = a_2 = a$ (which is generally the case)

then $A^2 = a^2 + a^2 + 2a^2\cos\delta$

$$A^2 = 2a^2[1+\cos\delta]$$

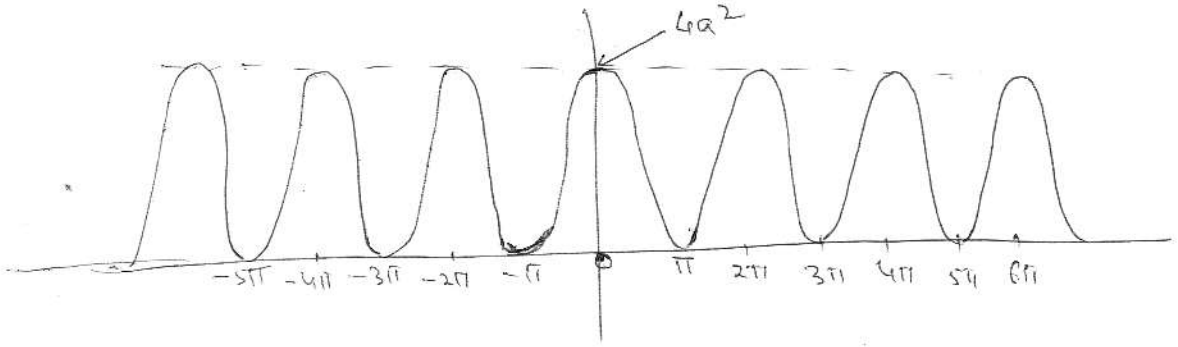
$$\Rightarrow I = 2a^2(1+\cos\delta)$$

At max at $\delta = 0, 2\pi, 4\pi, 6\pi \ldots$ $\cos\delta = 1$

$$\therefore I = I_{max} = 2a^2[1+1] = 4a^2$$

At minima at $\delta = \pi, 3\pi, 5\pi \ldots$ $\cos\delta = -1$

$$\therefore I = I_{min} = 2a^2[1-1] = 0$$



Note 1 If $a_1 \neq a_2$ then

$$I = I_1 + I_2 + 2\sqrt{I_1 I_2}\cos\delta$$

where $I_1 = a_1^2$ and $I_2 = a_2^2$ are intensities due to individual sources

Note 2 : intensities from two sources are proportional to width of sources

$$\therefore \frac{I_1}{I_2} = \frac{w_1}{w_2} = \frac{a_1^2}{a_2^2}$$