Question. Two waves of the same frequency and constant phase difference have intensities in the ratio $36 : 4$. These waves are superposed and interference fringe pattern is obtained. Calculate the ratio of the maximum to minimum intensity.

Given. $\frac{I_1}{I_2} = \frac{36}{4}$.

Find. $\frac{I_{max}}{I_{min}} - ?$

Solution.

So,

$$\frac{I_1}{I_2} = \frac{(a_1)^2}{(a_2)^2} = \left(\frac{a_1}{a_2}\right)^2 = \frac{36}{4} = \left(\frac{6}{2}\right)^2$$

$$\frac{a_1}{a_2} = \frac{6}{2}$$

$$\frac{I_{max}}{I_{min}} = \frac{(a_1 + a_2)^2}{(a_2 - a_2)^2} = \frac{(6+2)^2}{(6-2)^2} = \frac{64}{16} \; or \; \frac{4}{1}$$

Answer. $\frac{I_{max}}{I_{min}} = \frac{64}{16}$.

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