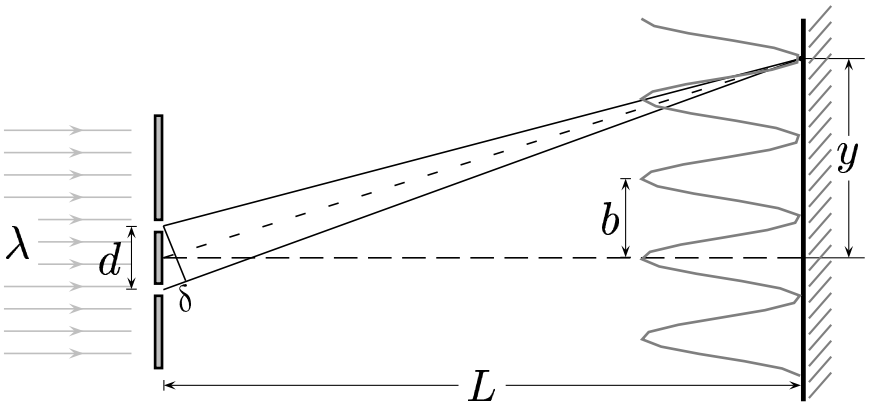
Consider the setup of a double slit experiment.



Find the third-minimum phase angle ϕ and path difference δ.

A) $\phi = 3\,\pi$ and $\delta = \dfrac{3\,\lambda}{2}$.

B) $\phi = 4\,\pi$ and $\delta = 2\,\lambda$.

C) $\phi = 5\,\pi$ and $\delta = \dfrac{5\,\lambda}{2}$.

D) $\phi = 6\,\pi$ and $\delta = 3\,\lambda$.

The intensity $I = I_0 \cos^2\left(\frac{\phi}{2}\right)$.

By inspection, the minimum sequence is at $\frac{\phi}{2} = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}$. So the third minimum occurs at

$$\phi = 5\pi, \quad \text{or} \quad \delta = \lambda \frac{\phi}{2\pi} = \frac{5\lambda}{2}$$

Answer **C**.

37.04-02˙Double˙Slit˙experiment 2004-3-24