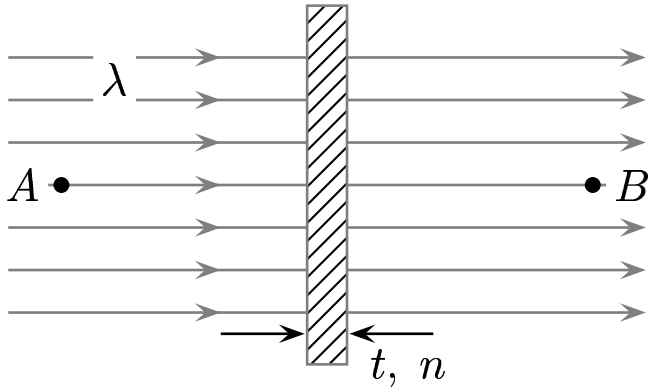
A light ray with wavelength λ passes from A to B through a plastic sheet of thickness t and index of refraction n.



Find the phase difference $\Delta\phi$ at B, with and without the film.

A) $\Delta\phi = 0.$

B) $\Delta\phi = (n-1)\,k\,t.$

C) $\Delta\phi = n\,k\,t.$

D) $\Delta\phi = (n+1)\,k\,t.$

Phase angles through the film $\phi = k\,t,\ \phi_n = k_n\,t = n\,k\,t$ for the cases without and with the film respectively. Therefore the phase difference at B is due to the phase difference traveling through the thickness of the film, with and without the film, which is given by $\Delta\phi = \phi_n - \phi = (n-1)\,k\,t$.

Answer **B**.

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