A light ray with wavelength $\lambda$ 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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