A circular disk is suspended by a wire attached to the top of some fixed support. When the disk is twisted through some small angle \( \theta \), the twisted wire exerts a restoring torque on the body which satisfies \( \tau = I \alpha = I \frac{d^2 \theta}{dt^2} = -\kappa \theta \), where \( \kappa \) is referred to as the torsion constant of the wire.

Find the period of the oscillation.

\[
\begin{align*}
A) \quad T &= \sqrt{\frac{I}{\kappa}}. \\
B) \quad T &= 2\pi \sqrt{\frac{I}{\kappa}}. \\
C) \quad T &= \sqrt{\frac{\kappa}{I}}. \\
D) \quad T &= 2\pi \sqrt{\frac{\kappa}{I}}.
\end{align*}
\]

Present equation of motion implies that, \( \omega = \frac{\kappa}{I} \), in turn: \( T = 2\pi \sqrt{\frac{I}{\kappa}} \).

Answer B.

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