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.

A) $T = \sqrt{\frac{I}{\kappa}}$.  
B) $T = 2\pi \sqrt{\frac{I}{\kappa}}$.  
C) $T = \sqrt{\frac{\kappa}{I}}$.  
D) $T = 2\pi \sqrt{\frac{\kappa}{I}}$. 
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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