The moment of inertia of a rod about its center of mass (point \(O\), the mid-point in the sketch) is given by \(I_{cm} = \frac{mL^2}{12}\). Here \(L\) is length of the rod.

Based on the law of parallel axis \(I' = I_{cm} + MD^2\), determine the moment of inertia defined by a rotating axis parallel to \(O'O''\), and this axis passes through \(A\), one of the end points of the rod.

A) \(I' = \frac{mL^2}{3}\).

B) \(I' = \frac{mL^2}{6}\).

C) \(I' = \frac{mL^2}{12}\).
\[ I' = m \left( \frac{L}{2} \right)^2 + I_{cm} = \frac{m L^2}{4} + \frac{m L^2}{12} = \frac{m L^2}{3}. \]

Answer A.

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