

Conservation of Energy

Solution:

The correct answer is c.)

At the top of the incline, the object has potential energy mgh . As it rolls down, part of this P.E. gets converted to translational K.E. ($= (1/2)mv^2$), while the rest appears as rotational K.E. ($= (1/2)I\omega^2$, due to friction). Thus, the total K.E. is the sum of the translational and rotational components:

$$mgh = \frac{1}{2}(mv^2 + I\omega^2)$$