A circular disk with mass $m$ and radius $R$ is mounted at its center, about which it can rotate freely. A light cord wrapped around it supports $m g$.

Find the total kinetic energy of the system, when the mass $m$ is falling with the speed $v$.

A) $K = \frac{1}{2} m v^2$  
B) $K = \frac{3}{4} m v^2$.

C) $K = m v^2$  
D) $K = \frac{5}{4} m v^2$.

Based on conservation of energy, express $v$ in terms of the falling distance $h$.

$$K = K_{trans} + K_{rot} = \frac{1}{2} m v^2 + \frac{1}{4} m R^2 \omega^2 = \frac{3}{4} m v^2.$$  
Answer B.

10.08-01 'A' Disk 'and a Mass 2006-10-10