



$$E^i = mgD$$

$$E^f = \frac{1}{2}kD^2 + \frac{1}{2}I\omega^2 + \frac{1}{2}mv^2$$

$$I = \frac{1}{2}MR^2$$

$$\omega = \frac{v}{R}$$

$$v = \sqrt{\frac{2}{3} \left( 2gD - \frac{k}{m}D^2 \right)}$$