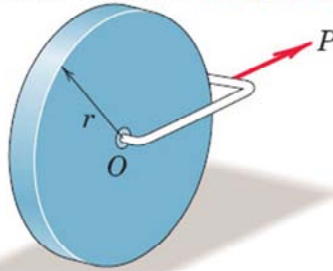


## Impulse-Momentum for Rigid Bodies: Exercise 1

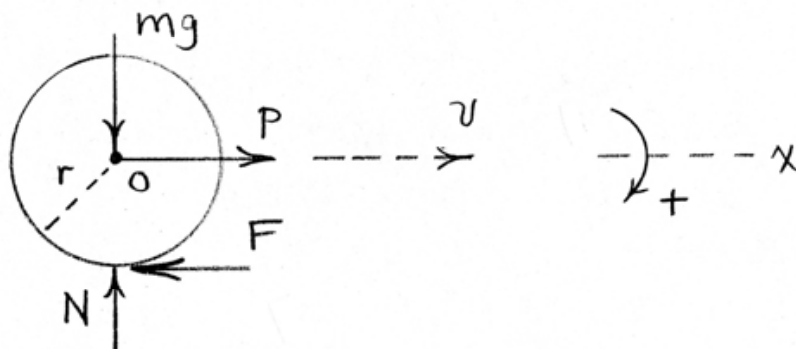
A constant horizontal **force**  $P$  is applied the light yoke attached to the **center**  $O$  of a uniform circular disk of **mass**  $m$ , which is initially at rest and rolls without slipping.



Determine the **velocity**  $v$  of the **center**  $O$  in terms of  $t$ .

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$$\int \Sigma F_x dt = \Delta m v_x : (P - F)t = mv - 0$$

$$\int \Sigma M_o dt = \Delta I_o \omega : Frt = \frac{1}{2} mr^2 \left( \frac{v}{r} - 0 \right)$$

$$\text{Eliminate } F \text{ \& obtain } v = \underline{\underline{\frac{2Pt}{3m}}}$$