

P122 Extra Balanced Problem - Connected Objects - Con Sp.

A 200 N object sits on a table and is connected by a rope over a pulley at an angle of 35° to a hanging mass, M. If $\mu = 0.30$ What is the mass M to cause this system to move at a Constant Speed?

$\theta = 35^\circ$

$\mu = 0.3$

$F_g = 200\text{ N}$

$F_{gm} = F_g \sin 35^\circ$

$F_{gmx} = F$

$F_{gmx} = F_{gm} \cos 35^\circ$

$\cos 35^\circ = \frac{F_{gmx}}{F_{gm}}$

$N + F_{gmy} = F_g$

$N + F_{gmy} = 200\text{ N}$

$N = 200 - F_{gmy}$

$M = \frac{F}{N} = \frac{F_{gm} \cos 35^\circ}{200 - F_{gm} \sin 35^\circ}$

$0.3 = \frac{F_{gm} \cos 35^\circ}{200 - F_{gm} \sin 35^\circ}$

$0.3(200 - F_{gm} \sin 35^\circ) = F_{gm} \cos 35^\circ$

Mar 16-8:56 AM