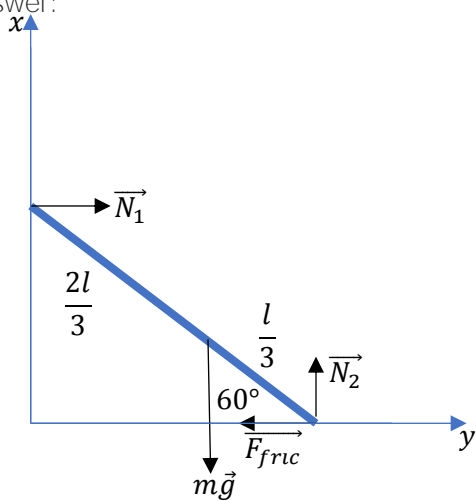


Answer on Question #67613, Physics / Mechanics | Relativity

Question:

A ladder rests against a smooth wall making an angle 60° with the ground, the ladder weights 200N and its centre of gravity is at $1/3$ of its length from the base. Determine:(a)the frictional force which prevents the ladder from the slipping.(b)the co-efficient of the static friction.

Answer:



As, the ladder is not moving: $\sum \vec{F} = 0 = m\vec{g} + \vec{F}_{fric} + \vec{N}_2 + \vec{N}_1$

In projections:

on OX: $mg = N_2$

on OY: $N_1 = F_{fric}$

As the ladder is not rotating: $\sum \vec{M} = 0$

In projections: $\frac{mgl}{3} * \cos(60^\circ) = N_1 l * \sin(60^\circ)$

Solving this system: $N_1 = F_{fric} = \frac{mg}{3} \cot(60^\circ) = 38.5\text{N}$

$$\mu = \frac{F_{fric}}{N_2} = \frac{\cot(60^\circ)}{3} = 0.192$$

Answer provided by <https://www.AssignmentExpert.com>