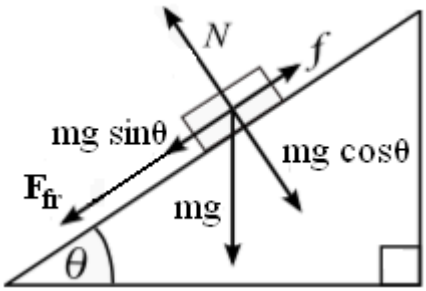
Answer on Question #64165, Physics / Mechanics | Relativity

The force which must be applied to the body when the board makes an angle of 45o with the horizontal a) just to make the body move up the plane, b) just to prevent the body from sliding down the plane.

Answer:



Where $\theta = 45^0$

The balance of forces acting on the body is something inclined plane in the illustration. The force of gravity is directed vertically downward, can be decomposed into two components: a component parallel to the inclined plane, and a component perpendicular to the inclined plane. When moving up the body, even if this movement is uniform, the movement also prevents friction.

a) $F_{fr} = \mu N = \mu mg \cos\theta$

Where, μ is coefficient of friction.
In this case, the uniform movement of the body is necessary to put up power.

$f = \mu mg \cos\theta + mg \sin\theta = mg (\mu \cos\theta + \sin\theta)$

b) If the body does not exert any external force, it can remain on the inclined plane at rest or slide down. As a potential or actual movement of the body in this case is directed downward, the friction force acting against the component parallel to the plane of gravity. The condition is an expression of balance

$mg \sin\theta = \mu mg \cos\theta$

or

$tg\theta = \mu$
$tg\ 45^0 = 1$
$\mu = 1$