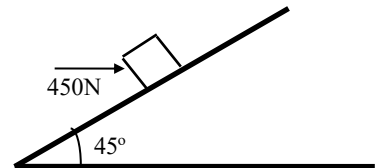


PHY1010 Tutorial Sheet 3 2020/2021

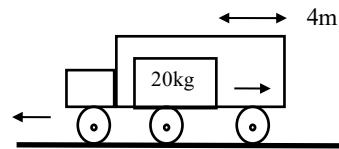
Newton's Laws of Motion

01*. A 45 kg woman stands on a spring scale inside an elevator. (The scale reads the force with which it pushes upward on the woman). What does the scale read when the elevator is accelerating (a) upward at 3.65 m/s^2 , (b) downward at 3.65 m/s^2 ? [605.25N, 276.75N]

02*. When a force of 450 N pushes on a 20 kg box as shown, the acceleration of the box up the incline is 0.70 m/s^2 . Find the coefficient of sliding friction between the box and the incline. [0.363]



03*. The rear side of a truck is open and a box of mass 20 kg is placed on the truck, 4 m away from the open end. If the truck starts from rest with an acceleration of 2 m/s^2 on a straight road, find the distance the truck will travel when the box will fall off from the rear. Given $\mu = 0.15$. [15.2m]

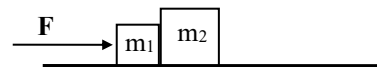


04. Two blocks with masses $m_1 = 3.2 \text{ kg}$ and $m_2 = 4.1 \text{ kg}$ are touching each other on a frictionless table. If the force \mathbf{F} is equal to 6.8 N,

(a) what is the acceleration of the two blocks, and (b) with what force does m_1 push against m_2 ?

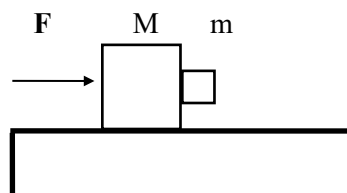
(c) Repeat (a) and (b) if \mathbf{F} is in the reverse direction and pushes on m_2 rather than on m_1 .

[0.932 m/s^2][3.82 N][-0.932 m/s^2][2.98 N]

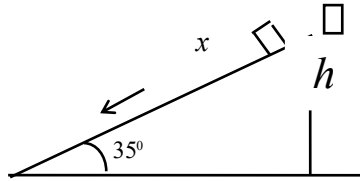


05*. The force \mathbf{F} in the figure pushes a block of mass M , which in turn pushes a block of mass m . There is no friction between M and the supporting surface. If the coefficient of friction between the two blocks is μ , how large must \mathbf{F} be if the block of mass m is not to slip?

slip? $F = (M + m) \cdot \frac{g}{m}$



06.** A block takes twice as long to slide down an inclined plane that makes an angle of 35° with the horizontal as it does to fall freely through the same vertical distance h .
 What is the coefficient of kinetic friction? [$\mu = 0.16$]



07. The two boxes have identical masses of 45kg. Both experience a sliding friction force with $\mu = 0.15$. Find the tension in the tie cord and the acceleration of the boxes.
 [$T = 114.68\text{N}$. $a = 1.078\text{m/s}^2$]

