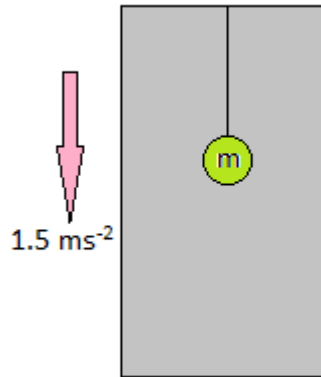


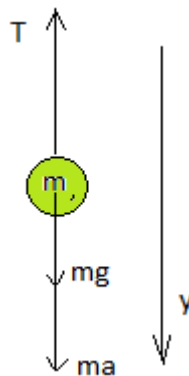
Answer on Question #66039, Physics / Mechanics | Relativity

A pendulum bob of mass 50 g is suspended on a string from the ceiling of an elevator which is moving downwards with an acceleration 1.5 ms^{-2} . Draw the free body diagram using the non-inertial frame of reference and determine the tension in the string. (Take $g = 10 \text{ ms}^{-2}$).

Solution:



Draw the free body diagram. On the ball of the pendulum the force of tension and the force of gravity and the pseudo force of movement of the Elevator.



We use Newton's second law

$$m\vec{a} = m\vec{g} + \vec{T}$$

$$\sum F_y = mg - T = ma$$

$$T = mg - ma$$

$$T = m \times (g - a)$$

$$T = 0.05 \text{ kg} \times (10 \text{ ms}^{-2} - 1.5 \text{ ms}^{-2})$$

$$T = 0.425 \text{ N}$$

Answer: 0.425 N