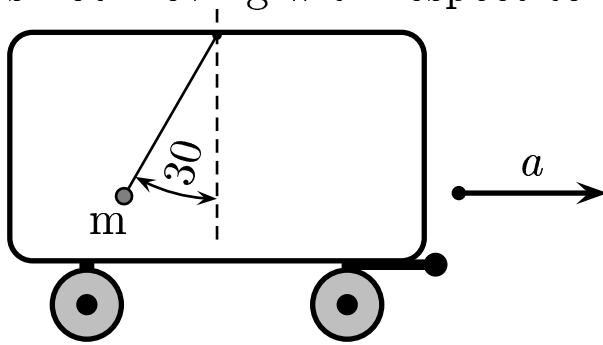


A simple pendulum is suspended at the ceiling of a box car. The car is accelerating with an acceleration a . To an observer inside of the box, the mass m is not moving with respect to him.



So in this accelerating frame; i.e., the non-inertial frame, the acceleration $a_{non-inertial} = 0$.

Identify the equation below which states “ $F = m a$ ” in this non-inertial frame.

- A) $T - m a = 0$.
- B) $T + m a = 0$.
- C) $T = m a$.

Explanation: To someone on the ground, which is an inertial frame (not the non-inertial frame), “ $F = m a$ ” says $T \sin \theta = m a$.

However, in the non-inertial frame, where $a_{non-inertial} = 0$, the corresponding net force must be $F_{non-inertial} = T - m a = m a_{non-inertial} = 0$.

Here “ $- m a$ ” is the inertial force, which is the “fictitious force”.

This fictitious force is present only in an accelerating frame, which the present case this is the box car frame.

Answer **A**.