Answer of question #78725 -Physics- Mechanics - Relativity

Find the value of the mass, m, such that the boxes move at constant speed. Assume that there is no friction in the pulley or the surface.
inclined plane = 40°
mass 1 = 15.6kg
mass 2 = m

Input Data:

Mass: $m_1 = 15.6kg;$

Inclined plane: $\alpha = 40°;$

Solution:

The speed will become constant when the forces are balanced.

Since the job does not exactly determine where the masses ***mass1*** and ***mass2*** are located, we have 2 solutions:

- When the mass ***m*** is hanging on the block:

Tension force through the block: $T = mg$

The tension force created by the mass on the inclined plane is equal to: $T = m_1 g * sin\ \alpha$

$mg = m_1 g * sin\ \alpha$

$m = m_1 * sin\alpha = 15.6 * 0.643 = 10kg$

- When the mass ***m*** is on an inclined plane:

Tension force through the block: $T = m_1 g$

The tension force created by the mass on the inclined plane is equal to: $T = mg * sin\ \alpha$

$m_1 g = mg * sin\ \alpha$

$m_1 = m * sin\ \alpha$

$$m = \frac{m_1}{sin\ \alpha} = \frac{15.6}{0.643} = 24.3kg$$

It is obvious that the mass on the inclined plane should be greater than the one that is thrown across the block.

Answer:

- m=10kg, when the mass ***m*** is hanging on the block
- m=24.3kg, when the mass ***m*** is on an inclined plane

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