One end of a massless string is connected to block A of mass 6.0 kg placed on a horizontal frictionless table. Block B of mass 4.0 kg hangs from the other end of the string which runs over a massless, frictionless pulley.

a) Find the acceleration on the blocks.
b) Find the tension T on the string.

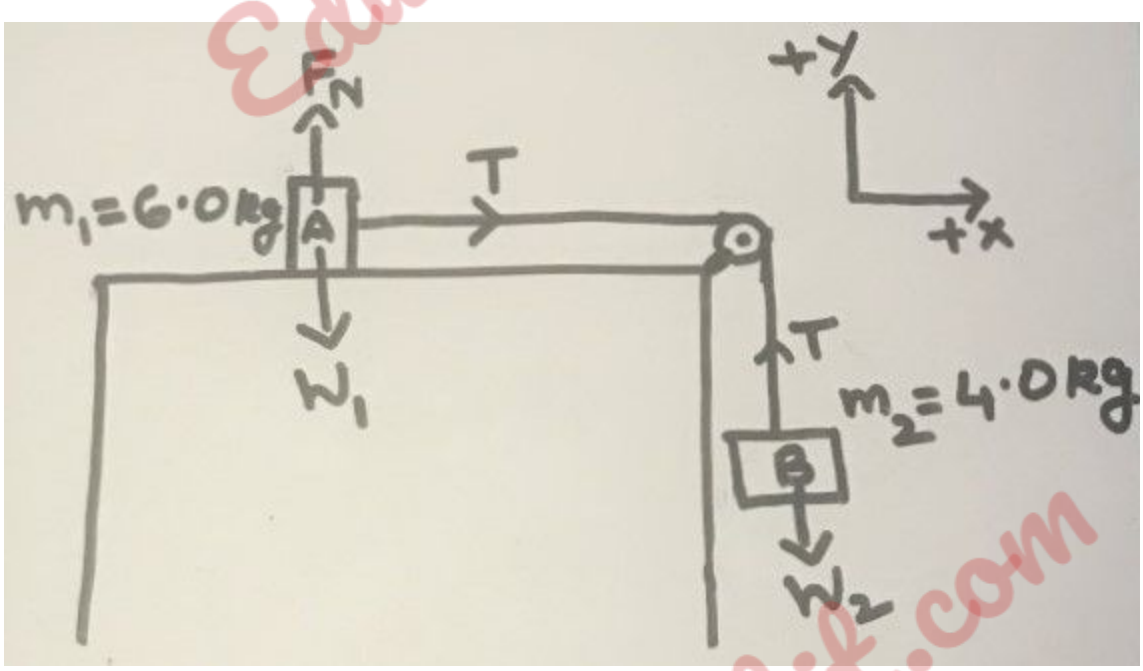

Fig (1)

Given:

Mass $m_1 = 6.0$ kg

Mass $m_2 = 4.0$ kg

Known:

Acceleration due to gravity: $g = -9.8\ m / s^2$

a) Determine: acceleration on the blocks: a

From Fig (1):

Tension T on the string:

$T = m_1 a$ ----------(1)

$m_2 a = W_2 - T = m_2 g - T$ ----------(2)

Combining (1) and (2):

$m_1 a = m_2 g - m_2 a$ ----------(3)

Rearranging (3) & substituting for m_1, m_2 and g in (3):

$a = 4.0 \times |-9.8| / (6.0 + 4.0) = 3.9\ m / s^2$

b) Determine: Tension on the string: T

From (1):

$T = m_1 a = 6.0 \times 3.9 = 23\ N$

N is Newtons, the unit of force.

$1\ N = 1\ kg\ m / s^2$.