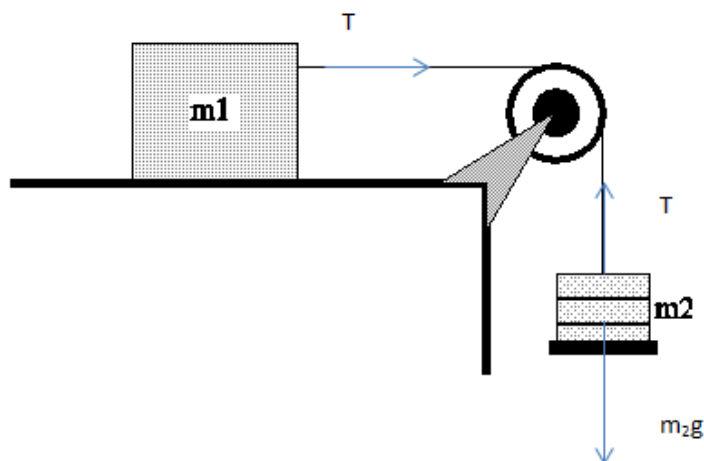**Answer on Question #40806 - Physics - Mechanics**

A block of mass 2 kg is connected to a freely hanging block of mass 4 kg by a light and inextensible string which passes over pulley at the edge of a table. The 2 kg mass is on the surface of the table assumed to be smooth. Calculate the acceleration of the system and the tension in the string.

Solution

Using the second Newton's law we have (**a** is acceleration of the system, **T** is the tension of string)

$$m_1 = 2kg$$
$$m_2 = 4kg$$
$$g = 9.8\frac{m}{s^2}$$
$$\begin{cases} m_1 a = T \\ m_2 a = m_2 g - T \end{cases} \Rightarrow$$

$$\begin{cases} a = \dfrac{m_2 g}{m_1 + m_2} = 6.53\dfrac{m}{s^2} \\ T = \dfrac{m_1 m_2 g}{m_1 + m_2} = 13.1N \end{cases}$$

Answer:

$$\begin{cases} a = \dfrac{m_2 g}{m_1 + m_2} = 6.53\dfrac{m}{s^2} \\ T = \dfrac{m_1 m_2 g}{m_1 + m_2} = 13.1N \end{cases}$$