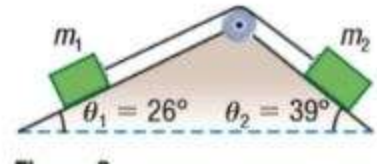
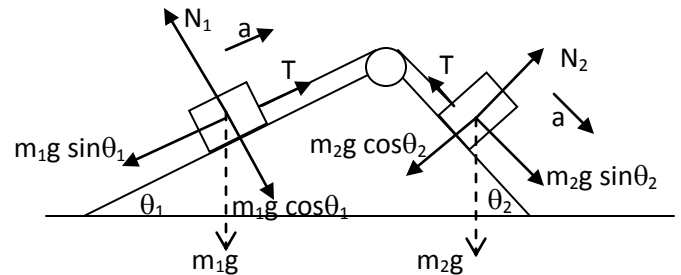


Q- Two masses $m_1 = 8.00 \text{ kg}$ and $m_2 = 12.0 \text{ kg}$ are placed on a triangular wedge of inclines θ_1 , and θ_2 as in the figure. Find the acceleration of the masses if friction is negligible.



(a) The forces acting on the blocks are their weights, tension in the string and the normal reactions of the inclined surfaces. As the blocks can move along the inclined surfaces, we will resolve their weights along and the normal to the surfaces.

The normal component of their weight will balance the normal reactions and thus need not to be considered. Hence we can write the equations of motion for the blocks as



$$m_2 g \sin \theta_2 - T = m_2 a \quad \text{----- (1)}$$

$$\text{And } T - m_1 g \sin \theta_1 = m_1 a \quad \text{----- (2)}$$

Adding the two equations we get

$$(m_1 + m_2) a = (m_2 - m_1) g \sin \theta_2$$

$$\text{Or } a = \frac{m_2 \sin \theta_2 - m_1 \sin \theta_1}{(m_1 + m_2)} * g$$

$$\text{Or } a = \frac{12 * \sin 39^\circ - 8 * \sin 26^\circ}{(8 + 12)} * 9.8 = 1.98 \text{ m/s}^2$$

(b) Substituting the value of a in equation 2 we get

$$T - 8.0 * 9.8 * \sin 26^\circ = 8.0 * 1.98$$

$$\text{Or } T = 50.2 \text{ N}$$