

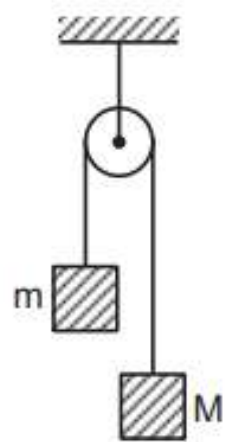
Two masses M and m ($M > m$) are joined by a light string passing over a smooth light pulley.

(a) The acceleration of each block is $\left(\frac{M - m}{M + m}\right)g$.

(b) The tension in the string is $\frac{2Mmg}{M + m}$.

(c) The centre of mass of the ' M plus m ' system moves down with an acceleration of $g\left(\frac{M - m}{M + m}\right)^2$.

(d) The tension in the string by which the pulley is attached to the roof is $(M + m)g$.



$$Mg - T = Ma \quad T - mg = ma$$

$$\text{Solving, } a = \left(\frac{M - m}{M + m} \right) g \quad \text{and} \quad T = \frac{2Mmg}{M + m}$$

$$a_{\text{CM}} = \frac{Ma - ma}{M + m} = \left(\frac{M - m}{M + m} \right) \left(\frac{M - m}{M + m} \right) g.$$

