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9. Eliminating T_1, T_2, a, and α between the five equations $m_1 g - T_1 = m_1 a$, $T_1 r - T_2 r = I\alpha$, $T_2 - m_2 g = m_2 a$, $\alpha = \frac{a}{r}$, and $P + Mg = Mg + T_1 + T_2$ yields the required result for I. The only difference in the second part is that the second equation becomes $T_1 r - T_2 r - C = I\alpha$, and so the same elimination yields $I = \frac{(m_1+m_2)P - 4m_1 m_2 g)r^2 - (m_1 - m_2)Cr}{(m_1+m_2)g - P}$, which can be seen to be smaller than that in part (i). The first four equations in this second part give $m_1 g - m_2 g - \frac{C}{r} = \left(m_1 + m_2 + \frac{I}{r^2}\right) a$, and so as $a > 0$, the required result follows.