Consider the setup shown, where the wheels and the pulley are frictionless. The force $F$ is adjusted such that $m_1$ is stationary with respect to the horizontal surface of the cart. The acceleration of the cart is $a$.

The Tension of the string is given by

A) $T = m_1 a$
B) $T = (m_1 + m_2) a$
C) $T = (m_1 + m_2) g$
D) $T = (m_1 - m_2) g$

Applying Newton’s second law to block $m_1$ in the horizontal direction yields

$m_1 : \sum F_x = T = m_1 a$.

Applying Newton’s second law to block $m_2$ in the vertical direction yields

$m_2 : \sum F_y = T - m_2 g = 0$.

$T = m_2 g$ is not given as a choice.

Answer **A**.

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