An elevator and its load have a combined mass of 1600 kg. Find the tension in the supporting cable when the elevator, originally moving downward at 20 m/s, is brought to rest with constant acceleration in a distance of 50 m.

\[ v_0 = 20 \text{ m/s}, \quad v_f = 0, \quad s = 50 \text{ m} \]

\[ m = 1600 \text{ kg} \]

10. \[ a = \frac{v_f^2 - v_0^2}{2s} = \frac{20^2}{2 \times 50} = 4.0 \text{ (m/s}^2) \text{ (upward)} \]

Tension T

15. \[ T - mg = ma \]

\[ T = mg + ma = 1600 \times (9.8 + 4) = 2.2 \times 10^4 \text{ (N)} \quad \text{or} \quad 4.9 \times 10^3 \text{ lb. (upward)} \]