13.35 Given: The 30-lb crate is being hoisted upward with a constant acceleration of 6 ft/s². If the uniform beam AB has a weight of 200 lb.

Find: The components of reaction at A.

Solution:

\[ F \begin{array}{c}
\text{FBD of Box} \\
\text{FBD of Beam} \\
\text{K.D.} \\
\text{K.P.} \\
\text{Mass} \end{array} \]

\[ F = 30 \text{ lb} + 5.59 \text{ lb} \]

\[ m = 30 \text{ lb} = 0.932 \text{ slugs} \]

\[ \Sigma F_x = 0 \]

\[ A_x + 35.59 = 0 \]

\[ A_x = -35.59 \text{ lb} \]

\[ \Sigma F_y = 0 \]

\[ A_y - 200 = 0 \]

\[ A_y = 200 \text{ lb} \]

\[ \Sigma M_A = 0 \]

\[ -200 \text{ lb} (2.5 \text{ ft}) - 35.59 \text{ lb} (5 \text{ ft}) + M_A = 0 \]

\[ M_A = 677.95 \text{ ft-lb} \text{ CCW} \]

Answers:

\[ A_x = -35.6 \text{ lb} \]

\[ A_y = 236 \text{ lb} \]

\[ M_A = 678 \text{ ft-lb} \text{ CCW} \]