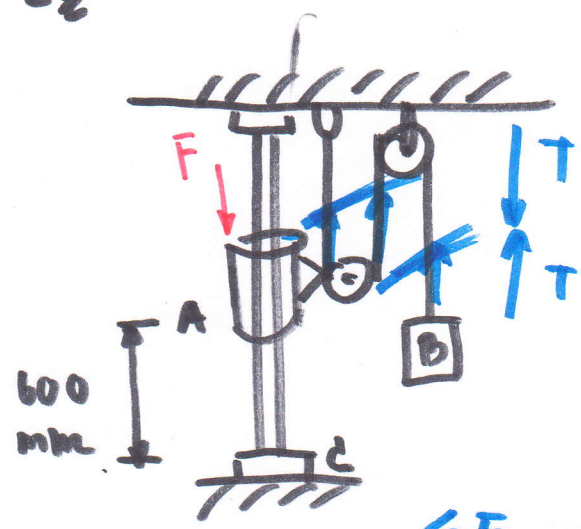


Ex



$m_A = 20 \text{ kg}$

$m_B = 10 \text{ kg}$

$F = 250 \text{ N}$

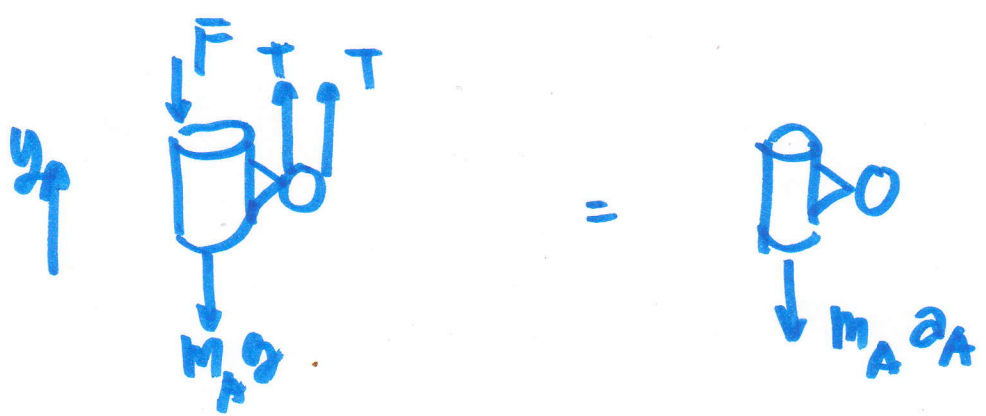
จงหา ความเร็ว ที่ collar A
 ภายหลังจากที่

$\sum F = ma$

วิธีทำ

FBD (Free body diagram)

collar A



$+\uparrow \sum F_y = m a_y$

$2T - F - m_A g = -m_A a_A$

$2T - (250 - 20 \times 9.81) = -20 a_A$

$2T + 20 a_A = 446.2 \quad \text{--- (1)}$



$$\uparrow \Sigma F_y = m a_y$$

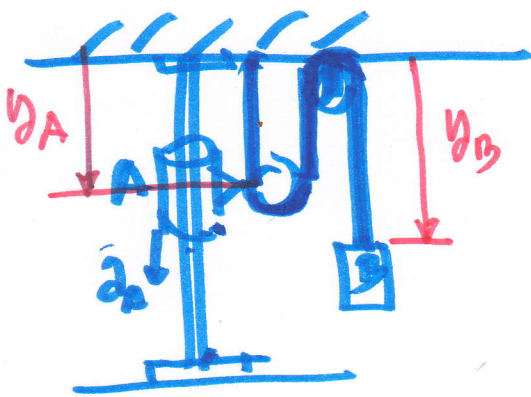
$$T - m_B g = m_B a_B$$

$$T - 10 \times 9.81 = 10 a_B$$

$$T - 10 (\overset{2a_A}{a_B}) = 98.1 \quad - (2)$$

$$2T + 20 a_A = 446.2 \quad - (1)$$

Summe Annahme



$$L = y_A + y_A + y_B + \text{const}$$

$$L = 2y_A + y_B + \text{const}$$

$$\frac{dL}{dt} = 0 + 2 \frac{dy_A}{dt} + \frac{dy_B}{dt} + \text{const}$$

$$0 = 2v_A + v_B$$

$$\frac{d}{dt} \Rightarrow 0 = 2a_A + a_B$$

$$2a_A = -a_B$$

$$\boxed{2a_A = a_B}$$

$$2T + 20a_A = 446.2 \quad - (1)$$

$$T - 20a_A = 98.1 \quad - (2)$$

$$Ax = b$$

$$\begin{bmatrix} 2 & 20 \\ 1 & -20 \end{bmatrix} \begin{Bmatrix} T \\ a_A \end{Bmatrix} = \begin{Bmatrix} 446.2 \\ 98.1 \end{Bmatrix}$$

$$\begin{Bmatrix} T \\ a_A \end{Bmatrix} = \frac{1}{\begin{bmatrix} 2 & 20 \\ 1 & -20 \end{bmatrix}} \begin{Bmatrix} 446.2 \\ 98.1 \end{Bmatrix}$$

A^{-1}

Given $A = \begin{bmatrix} 2 & 20 \\ 1 & -20 \end{bmatrix}$

$$A^{-1} = \frac{\text{adj}(A)}{\det(A)}$$

$$\det(A) = \begin{bmatrix} 2 & 20 \\ 1 & -20 \end{bmatrix} = (2 \times 20) - (1 \times 20) = -60$$

$$\text{adj}(A) = C_A^T$$

$$C_A = (-1)^{i+j} M_{ij}$$

$$= \begin{bmatrix} c_{11} & c_{12} \\ c_{21} & c_{22} \end{bmatrix} = \begin{bmatrix} -20 & -1 \\ -20 & 2 \end{bmatrix}$$

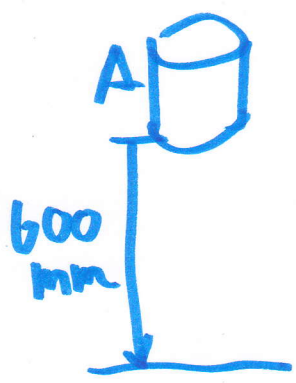
$$\text{adj}(A) = \begin{bmatrix} -20 & -20 \\ -1 & 2 \end{bmatrix}$$

$$A^{-1} = \frac{1}{-60} \begin{bmatrix} -20 & -20 \\ -1 & 2 \end{bmatrix}$$

$$\begin{Bmatrix} T \\ a_A \end{Bmatrix}_{2 \times 1} = \frac{1}{-60} \begin{bmatrix} -20 & -20 \\ -1 & 2 \end{bmatrix}_{2 \times 2} \begin{Bmatrix} 446.2 \\ 98.9 \end{Bmatrix}_{2 \times 1}$$

$$a_A = 4.1667 \text{ m/s}^2$$

$$T = 181.37 \text{ N}$$



$$v^2 = u^2 + 2a_A s$$

$$v^2 = 0^2 + 2(4.1667) \times 0.6$$

$$v = 2.296 \text{ m/s}$$