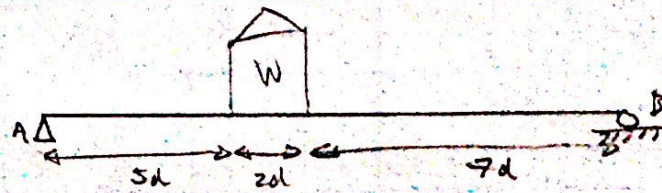


1. Given:



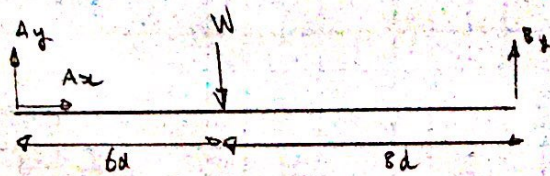
$$W = 10k \text{ lb}$$

$$d = 10 \text{ ft}$$

Find: reactions at A, B

Solution:

FBD:



$$\sum F_x = 0 \rightarrow A_x = 0 \quad (1)$$

$$\sum F_y = 0 \rightarrow A_y + B_y - W = 0$$

$$\sum M_A = 0 \rightarrow -W \cdot 6d + B_y \cdot 14d = 0$$

$$B_y = \frac{6}{14} W$$

$$B_y = 4.286k \text{ lb} \quad (2)$$

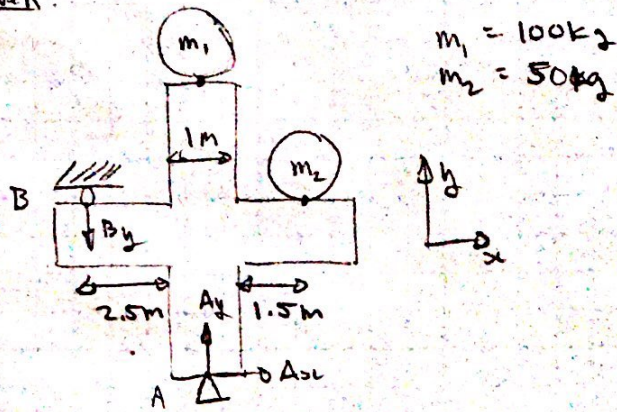
$$A_y + 4.286k \text{ lb} - 10000 \text{ lb} = 0$$

$$A_y = 5714 \text{ lb}$$

⇒ reaction at A:  $5714 \uparrow \text{ lb}$   
 reaction at B:  $4286 \uparrow \text{ lb}$



2. Given:



Find: reaction at A, B

Solution:

$$\Sigma F_x = 0 \rightarrow A_x = 0 \quad (1)$$

$$\Sigma F_y = 0 \rightarrow A_y - B_y - m_1 g - m_2 g = 0 \quad (2)$$

$$\Sigma M_A = 0 \rightarrow B_y(3) - m_2 g(2) = 0 \quad (3)$$

from (3):

$$2m_2 g = 3B_y$$

$$B_y = \frac{2}{3} m_2 g \quad (4)$$

(4) into (2):

$$A_y - \frac{2}{3} m_2 g - m_1 g - m_2 g = 0$$

$$A_y = \frac{5}{3} m_2 g + m_1 g$$

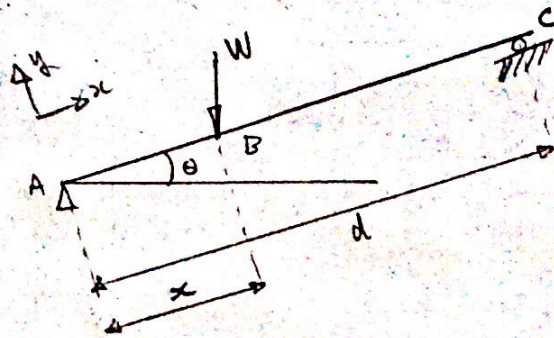
$$\Rightarrow B_y = 327\text{N}$$

$$A_y = 1798.5\text{N}$$

reaction at A:  $1798.5 \hat{j}\text{N}$   
 reaction at B:  $-327 \hat{j}\text{N}$



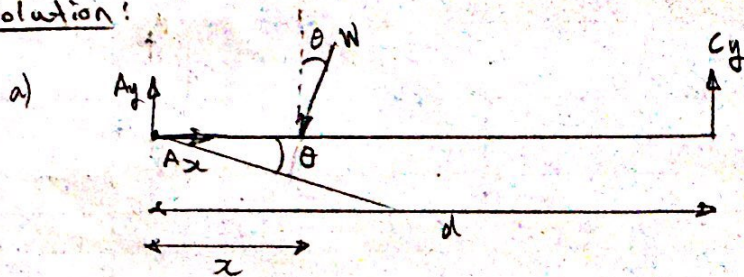
3. Given:



$$\begin{aligned} W &= 2.45 \text{ kN} \\ d &= 5 \text{ m} \\ x &= 2 \text{ m} \\ \theta &= 20^\circ \end{aligned}$$

Find: a) Draw FBD beam for given conditions  
b) Determine reactions at A, C

Solution:



$$\begin{aligned} d &= 5 \text{ m} \\ x &= 2 \text{ m} \\ \theta &= 20^\circ \end{aligned}$$

$$\text{b) } \sum F_x = 0 \rightarrow Ax - W \sin \theta = 0 \quad \text{①}$$

$$Ax = W \sin \theta$$

$$\sum F_y = 0 \rightarrow Ay - W \cos \theta + Cy = 0 \quad \text{②}$$

$$\sum M_A = 0 \rightarrow -W \left( \frac{x}{\cos \theta} \right) + Cy d = 0 \quad \text{③}$$

$$\text{from ①, } Ax = 837.9 \text{ kN}$$

$$\text{from ③, } Cy = W \left( \frac{x}{\cos \theta} \right) \cdot \frac{1}{d}$$

$$Cy = 1042.9 \text{ kN} \quad \text{④}$$

$$\text{④ into ②, } Ay = W \cos \theta - Cy$$

$$Ay = 1259.4 \text{ kN}$$

in the given coordinate system,

$$\begin{aligned} \text{reaction at A: } & 837.9 \hat{i} + 1259.4 \hat{j} \text{ kN} \\ \text{reaction at C: } & 1042.9 \hat{j} \text{ kN} \end{aligned}$$