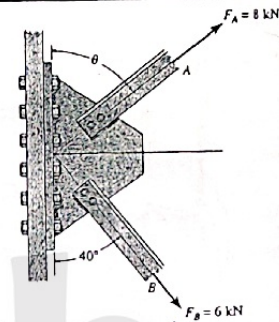
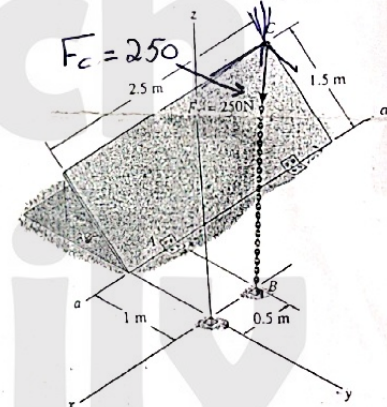




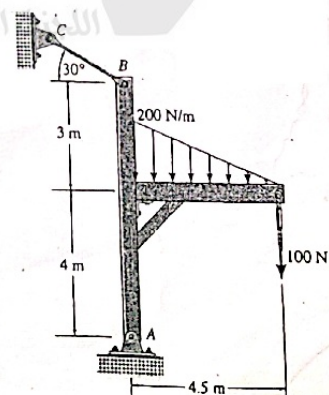
Determine the angle θ for connecting member A to the plate so that the resultant force of F_A and F_B is directed horizontally to the right. Also, what is the magnitude of the resultant force.



Determine the magnitude of the moment of the force F_C about the hinged axis aa of the door.

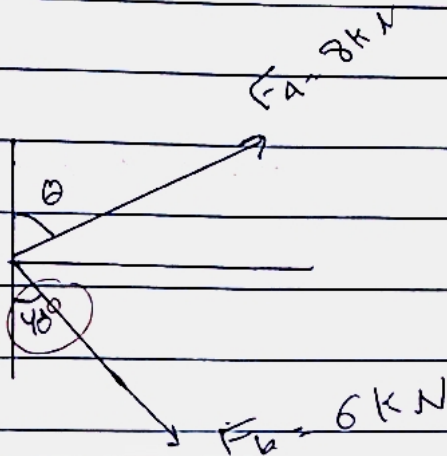


Determine the horizontal and vertical components of reaction at the pin A and the force in the cable BC . Neglect the thickness of the members.



الدكتور
ياسر هنياتي

Q:1



$$\Sigma F_y = 0 \quad \text{XX} \quad \Sigma F_y = R_y = 0$$

$$F_A \cos \theta - F_B \cos 40 = 0$$

$$8 \cos \theta - 6 \cos 40 = 0$$

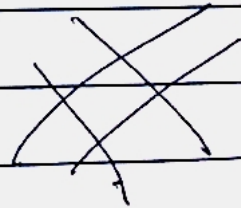
$$8 \cos \theta = 6 \cos 40$$

$$\theta = \cos^{-1} \frac{6 \cos 40}{8}$$

$$= 54.9^\circ$$

9

$$\begin{aligned} R = \Sigma F = \Sigma F_x &= F_A \sin \theta + F_B \cos 50 \\ &= 8 \sin 54.9 + 6 \cos 50 \\ &= 10.4 \text{ kN} \end{aligned}$$



A hand-drawn free-body diagram of a truss section. The diagram shows a triangular truss structure with various forces and dimensions labeled:

- Top Chord:** A member of length $2.5m$ inclined at 30° to the horizontal.
- Right Chord:** A vertical member of height $1.5m$.
- Internal Vertical Member:** A dashed vertical line from the top joint to the bottom chord, labeled $FC = 250N$ (Compression).
- Bottom Chord:** A horizontal member with a segment of length x from the left support to the internal vertical member's base.
- Left Support:** A pin support where reaction forces H (horizontal) and V (vertical) are shown.
- Right Support:** A roller support where reaction force B is shown.
- Angles:** An angle of 30° is indicated at the top-left joint, and an angle of 67.5° is indicated at the right support.
- Other Labels:** Points a , b , and c are marked on different members. A red gear watermark is visible in the background.

3

$$d_2 = 1.5 \sin 30 = -0.75 \text{ m}$$

$$d = \sqrt{dx^2 + dy^2 + dz^2} = 3.14 \text{ m}$$

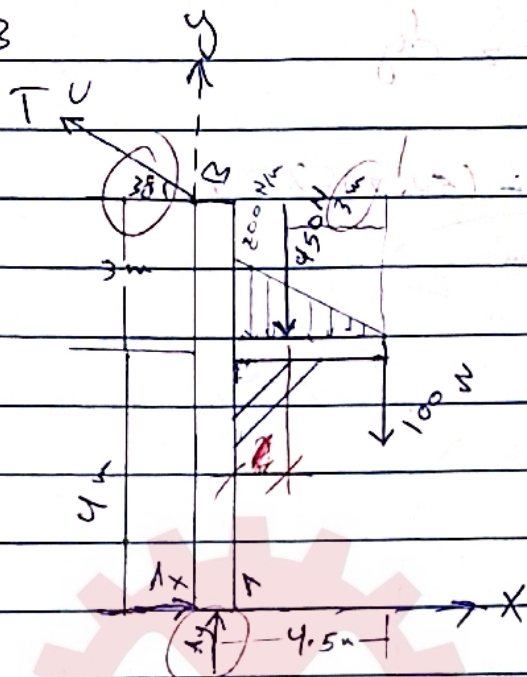
$$F_c = 250 \text{ N}$$

$$\frac{F_{cx}}{dx} = \frac{F_c}{dl} \Rightarrow F_{cx} = 159,12 \text{ N}$$

$$F_{cy} = \frac{(dy)(FC)}{d} = 183.1 \text{ N}$$

$$F_{c2} = \frac{(d2)(F_c)}{d} = 59.7 \text{ N}$$

Q: 3



(9)

$$\sum F_x = 0$$

$$A_x - T \cos 30 = 0 \quad \text{--- (1)}$$

$$\sum F_y = 0 \Rightarrow A_y + T \sin 30 - 450 - 100 = 0 \quad \text{--- (2)}$$

$$\sum M_A = 0$$

$$- (100)(4.5) - (450)(1.5) + (T \cos 30)(7) = 0$$

$\Rightarrow T = 185.6$ The force in BC
Substitute in (1)

$$A_x = T \cos 30$$

$$A_x = 160.7$$

Sub. in (2)

$$A_y = 550 - T \sin 30$$

$$A_y = 457.2$$