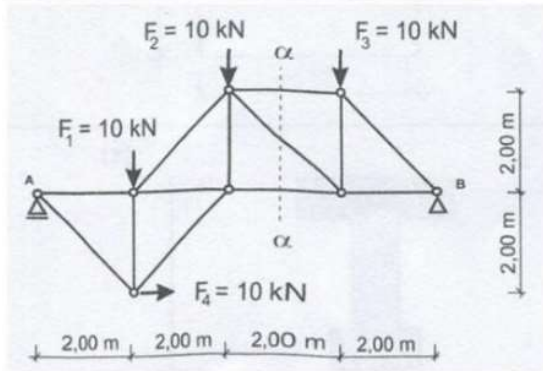
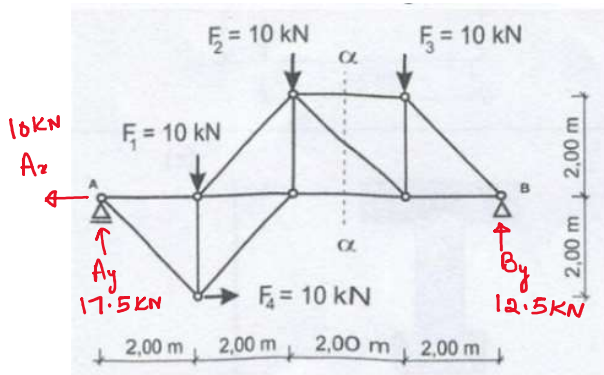


Ritter's Method Truss Analysis Problem-3 Solution

Please find the forces of members in $\alpha - \alpha$ section using Ritter method.



Step-1: Find the support reactions in Truss:



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$$\sum F_x = 0 :$$

$$-A_x + 10 = 0 \Rightarrow A_x = 10 \text{ kN}$$

$$\sum M_B = 0 :$$

$$(A_y \times 8) - (10 \times 6) - (10 \times 4) - (10 \times 2) - (10 \times 2) = 0$$

$$\Rightarrow A_y = 17.5 \text{ kN}$$

$$\sum M_A = 0 :$$

$$(10 \times 2) - (10 \times 2) + (10 \times 4) + (10 \times 6) - (B_y \times 8) = 0$$

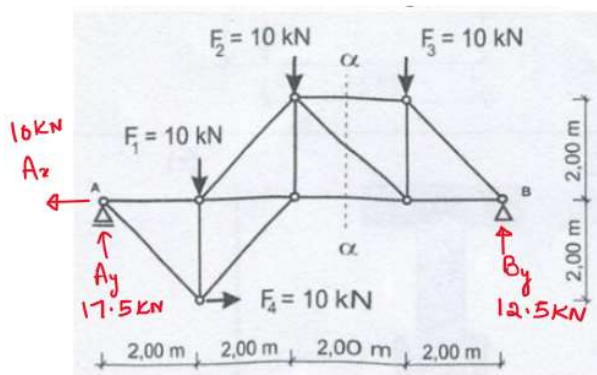
$$\Rightarrow B_y = 12.5 \text{ kN}$$

Check:

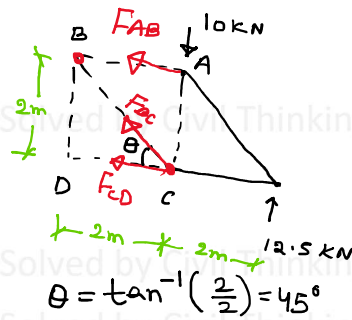
$$+\uparrow \sum F_y = 17.5 - 10 - 10 - 10 + 12.5 = 0 \text{ O.K. } \checkmark$$

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Step-2: Apply Ritter's method on a simpler portion to the left or right of $\alpha - \alpha$ section:



Choosing Right Position :



$$\theta = \tan^{-1}\left(\frac{2}{2}\right) = 45^\circ$$

$$\begin{aligned} \sum M_C = 0: \\ -(12.5 \times 2) - (F_{AB} \times 2) = 0 \end{aligned}$$

$$\Rightarrow F_{AB} = -12.5 \text{ kN}$$

$$\sum M_B = 0:$$

$$-(12.5 \times 4) + (10 \times 2) + (F_{CD} \times 2) = 0 \Rightarrow F_{CD} = 15 \text{ kN}$$

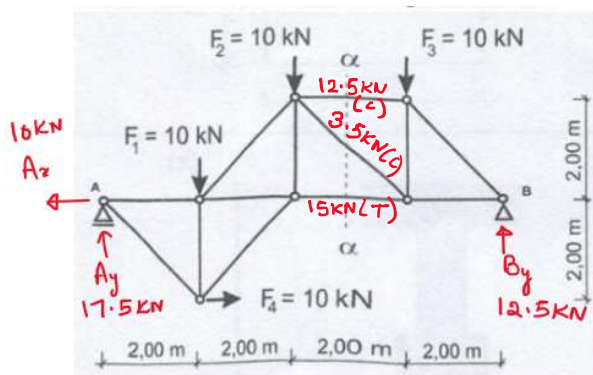
$$\sum F_x = 0:$$

$$-15 - (-12.5) - F_{BC} \cos 45^\circ = 0 \Rightarrow F_{BC} = \frac{-5\sqrt{2}}{2} = -3.5 \text{ kN}$$

Check:

$$\sum F_y = -10 + \left(-\frac{5\sqrt{2}}{2}\right) \sin 45^\circ + 12.5 = 0 \quad \text{O.K.}$$

Final Answers:



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