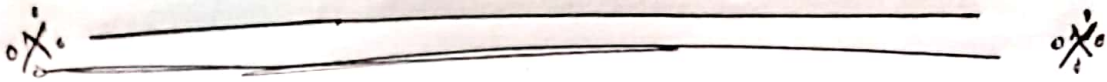


Structure Analysis



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Section :- A.

Assignment No :- 02

Date :- 12/7/2020

Submitted to :- Engr Amjid Islam.

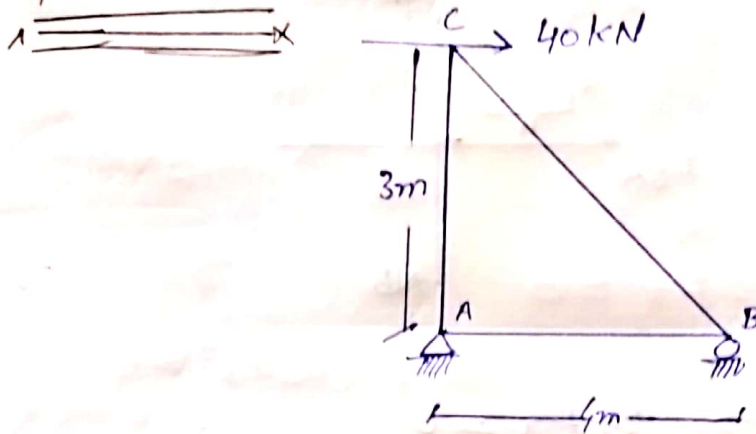
①

Q No 1

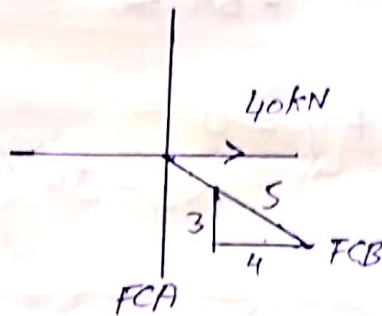


Determine the force in each member of the truss and state whether it is in tension or compression.

Solution



In order to solve first we should analysis Joint C.



$$\rightarrow \sum F_x = 0 \quad (\text{Horizontal Force})$$

$$40 - F_{CB} \left(\frac{4}{5}\right) = 0$$

$$F_{CB} = 50 \text{ kN (C)}$$

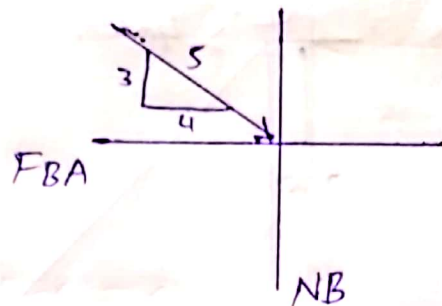
$$+\uparrow \sum F_y = 0$$

(Vertical) (2)

$$50\left(\frac{3}{5}\right) - F_{CA} = 0$$

$$F_{CA} = 30 \text{ kN (T)}$$

Now we analysis Joint (B)



$$+\rightarrow \sum F_x = 0$$

$$50\left(\frac{4}{5}\right) - F_{BA} = 0$$

$$F_{BA} = 40 \text{ kN (T)}$$

$$+\uparrow \sum F_y = 0$$

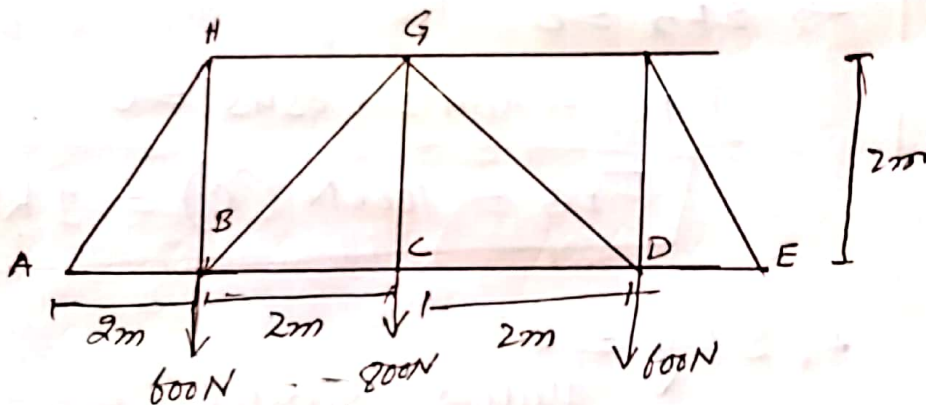
$$N_B - 50\left(\frac{3}{5}\right) = 0$$

$$N_B = 30 \text{ kN}$$

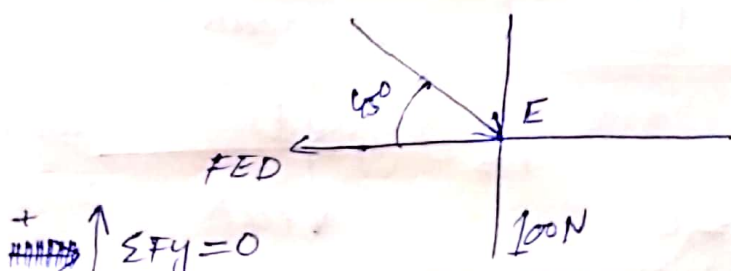
Q No 2

Determine the force in each member of the truss. Indicate if the member are in tension or compression. Assume all members are pin connected.

Given



Solution :- First we analysis Joint (E)



$\sum F_y = 0$
 $1000 - F_{EF} \sin 45^\circ = 0$
 $F_{EF} = 1414.21 \text{ N (C)}$

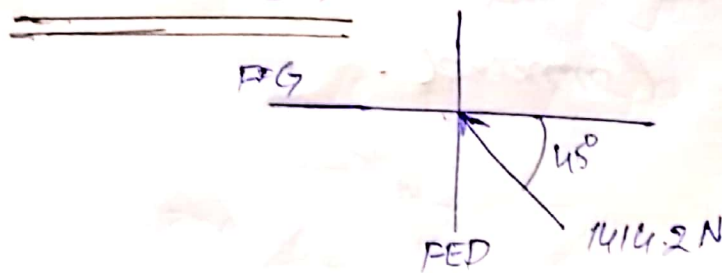
$\therefore \boxed{= 1.414 \text{ KN (C)}}$

$\rightarrow \Sigma F_x = 0$

$1414.21 \cos 45^\circ - FED = 0$

$FED = 1000 \text{ N (T)}$
or 1 kN (T)

Joint (F)



$\rightarrow \Sigma F_x = 0$

$F_{FG} - 1414.21 \cos 45^\circ = 0$

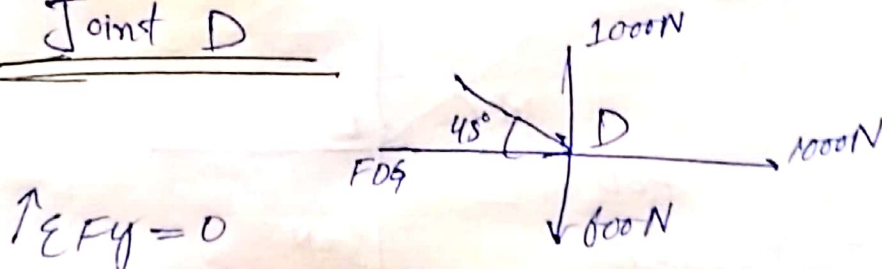
$F_{FG} = 1000 \text{ N (C)} = 1 \text{ kN (C)}$

$\uparrow \Sigma F_y = 0$

$1414.21 \sin 45^\circ - FED = 0$

$FED = 1000 \text{ N (T)} = 1 \text{ kN (T)}$

Joint D



$\uparrow \Sigma F_y = 0$

$1000 - 600 - FDG \sin 45^\circ = 0$

$FDG = 565.69 \text{ N (C)}$

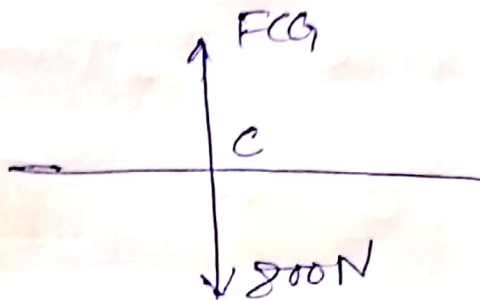
$$\rightarrow \sum F_x = 0$$

5

$$1000 + 565 \cdot 69 \cos 45^\circ - F_{DC} = 0$$

$$\begin{aligned} F_{DC} &= 1400 \text{ N (T)} \\ &= 1.4 \text{ kN (T)} \end{aligned}$$

Joint C



$$+\uparrow \sum F_y = 0$$

$$F_{CG} - 800 = 0$$

$$F_{CG} = 800 \text{ N (T)}$$

Due to symmetry.

$$\rightarrow F_{BC} = F_{DC} = 1.4 \text{ kN (T)}$$

$$\rightarrow F_{HB} = F_{FD} = 1.0 \text{ kN (T)}$$

$$\rightarrow F_{BG} = F_{DG} = 5.66 \text{ N (T)}$$

$$\rightarrow F_{HG} = F_{FG} = 1.0 \text{ kN (C)}$$

$$\rightarrow F_{AH} = F_{EP} = 1.41 \text{ kN (C)}$$

$$\rightarrow F_{AB} = F_{ED} = 1.0 \text{ kN (T)}$$

