

ASSIGNMENT

ANALYSIS OF STATICALLY DETERMINATE TRUSSES

Submitted by

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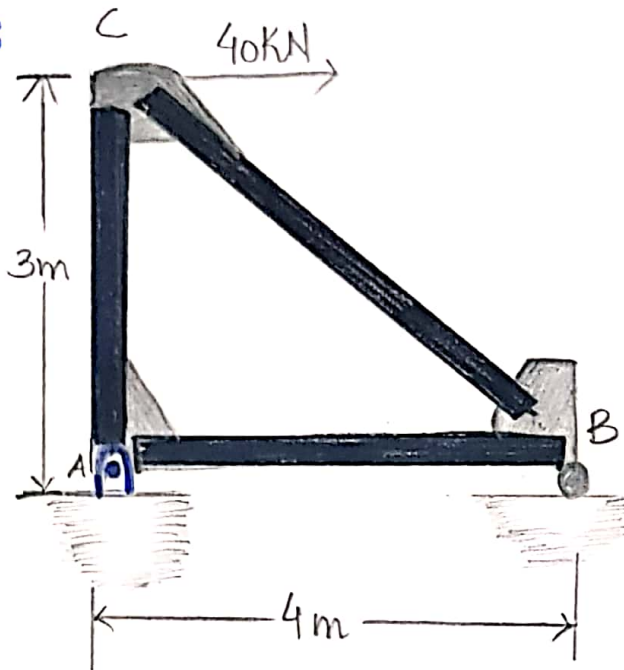
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Section: B

QUESTION No.1

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

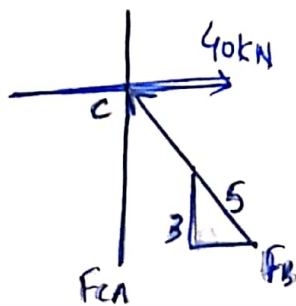
Figure:



Solution:

First of all analyze joint C

So,



$$\sum F_x = 0$$

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

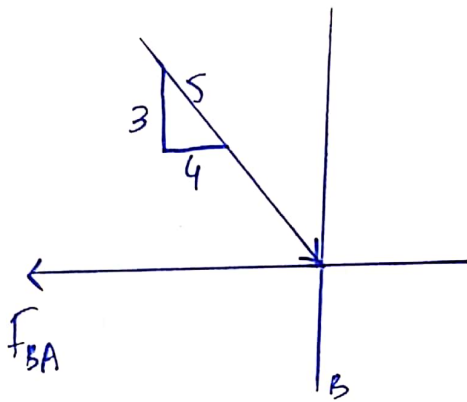
$$F_{CB} = 50.0 \text{ kN (C)}$$

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

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

$$F_{CA} = 30.0 \text{ kN (T)}$$

Now Analyze joint R



$$+\rightarrow \sum F_x = 0 \quad 50\left(\frac{4}{5}\right) - F_{BA} = 0$$

$$F_{BA} = 40.0 \text{ kN (T)}$$

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

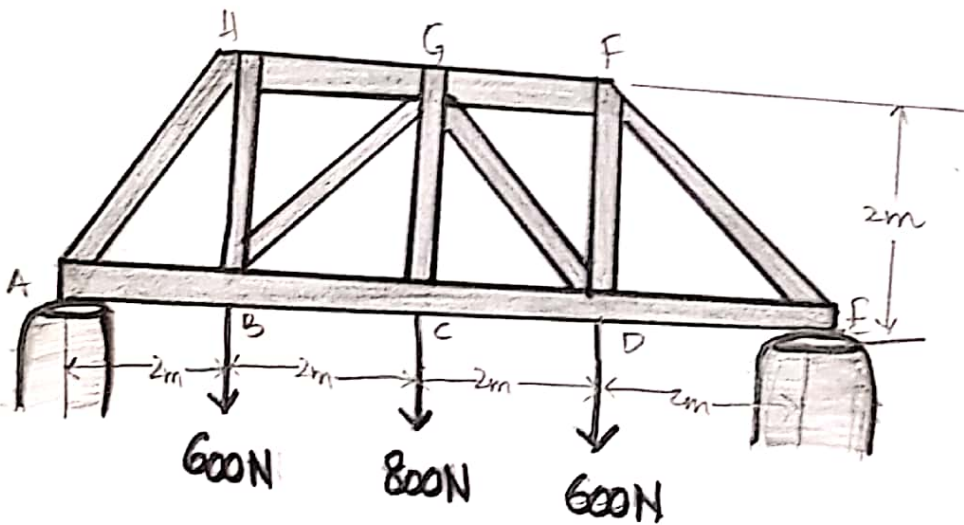
$$N_B = 50 \cdot 0\left(\frac{3}{5}\right) = 0$$

$$N_B = 30.0 \text{ kN}$$

QUESTION No. 2

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

Figure:



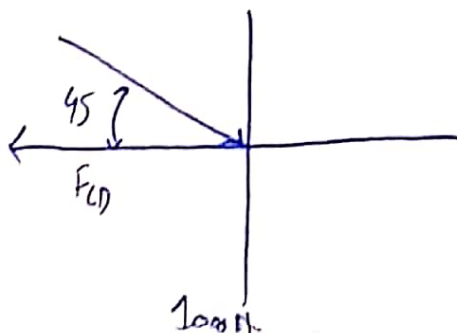
Solution:

$$\sum M_A = 0$$

$$E_y(8) - 600(2) - 800(4) - 600(6) = 0$$

$$E_y = 1000 \text{ N}$$

Now we analyze (E) joint



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

$$1000 - F_{EF} \sin 45^\circ = 0$$

$$F_{EF} = 1414.21 \text{ N (C)}$$

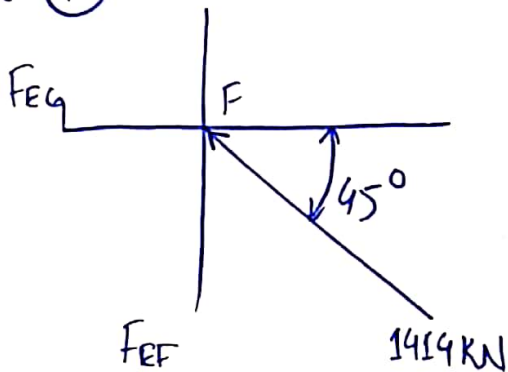
$$\Rightarrow 1.41 \text{ kN (C)}$$

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

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

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

Joint (F)



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

$$F_{EG} = 1414.21 \cos 45^\circ = 1000$$

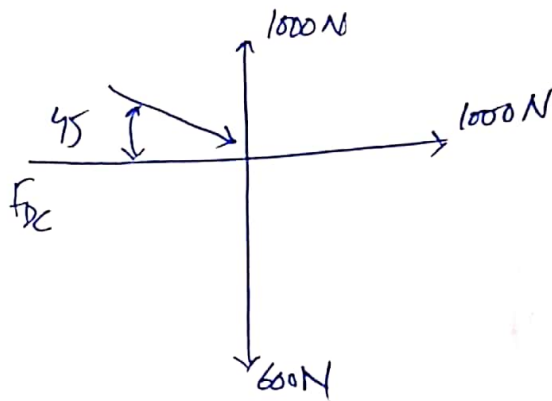
$$F_{EG} = 1000 \text{ N (C)} = 1 \text{ kN (C)}$$

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

$$1414.21 \sin 45^\circ - F_{ED} = 0$$

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

Joint D



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

$$1000 - 600 - F_{DC} \sin 45^\circ = 0$$

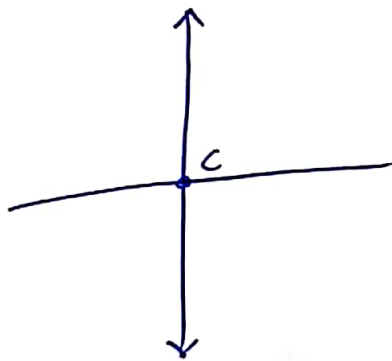
$$F_{DC} = 565.69 \text{ N (C)} = 566 \text{ N (C)}$$

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

$$1000 + 565.69 \cos 45^\circ - F_{DC} = 0$$

$$F_{DC} = 1400 \text{ N (+)} \Rightarrow 1.4 \text{ kN (+)}$$

Joint C



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

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

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

Due to Symmetry

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

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

$$F_{BG} = F_{DG} = 566 \text{ kN (T)}$$

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

$$F_{AH} = F_{EF} = 1.41 \text{ kN (T)}$$

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