

Assignment #2

Name: Hasnail Mufti

ID :- 7952

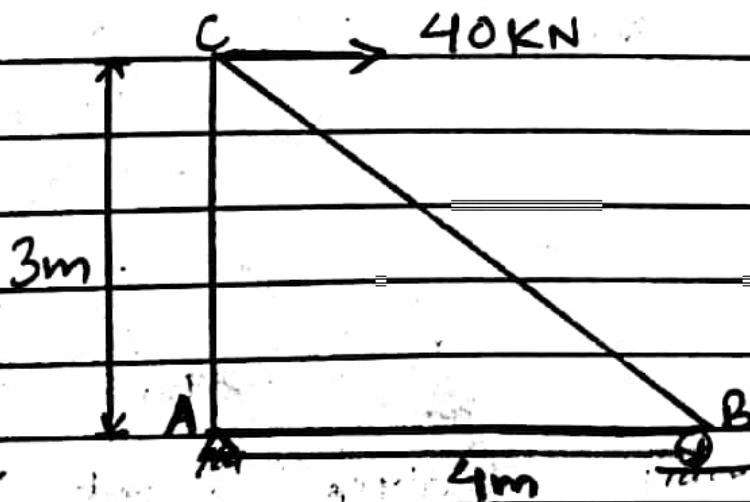
Sec :- B

Subject:- Structural Analysis
I

Submitted to:- Sir Amjad Islam

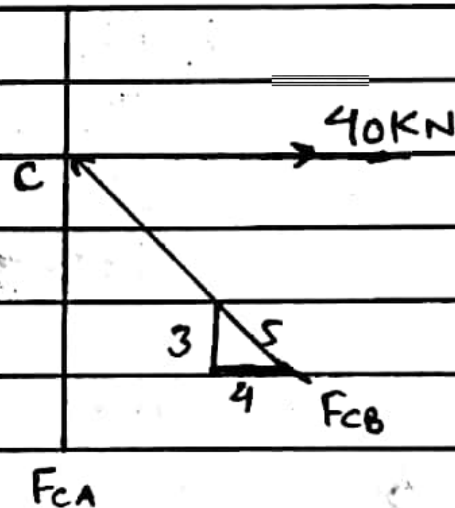
⇒ Question # 01

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



SOLUTION:

First of all we analyse joint "C"



$$\rightarrow \sum F_x = 0$$

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

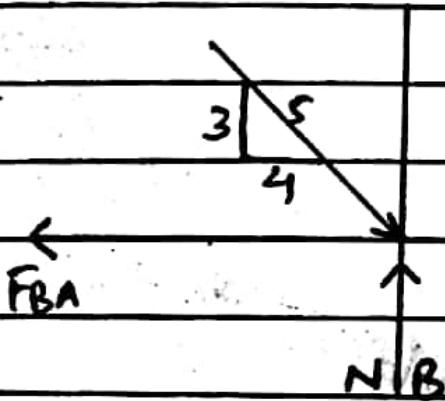
$$F_{CB} = 50 \text{ KN (C)}$$

$$\uparrow \sum F_y = 0$$

$$50 (3/5) - F_{CA} = 0$$

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

Now; we analyse joint "B"



$$\rightarrow \sum F_x = 0$$

$$50 (4/5) - F_{BA} = 0$$

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

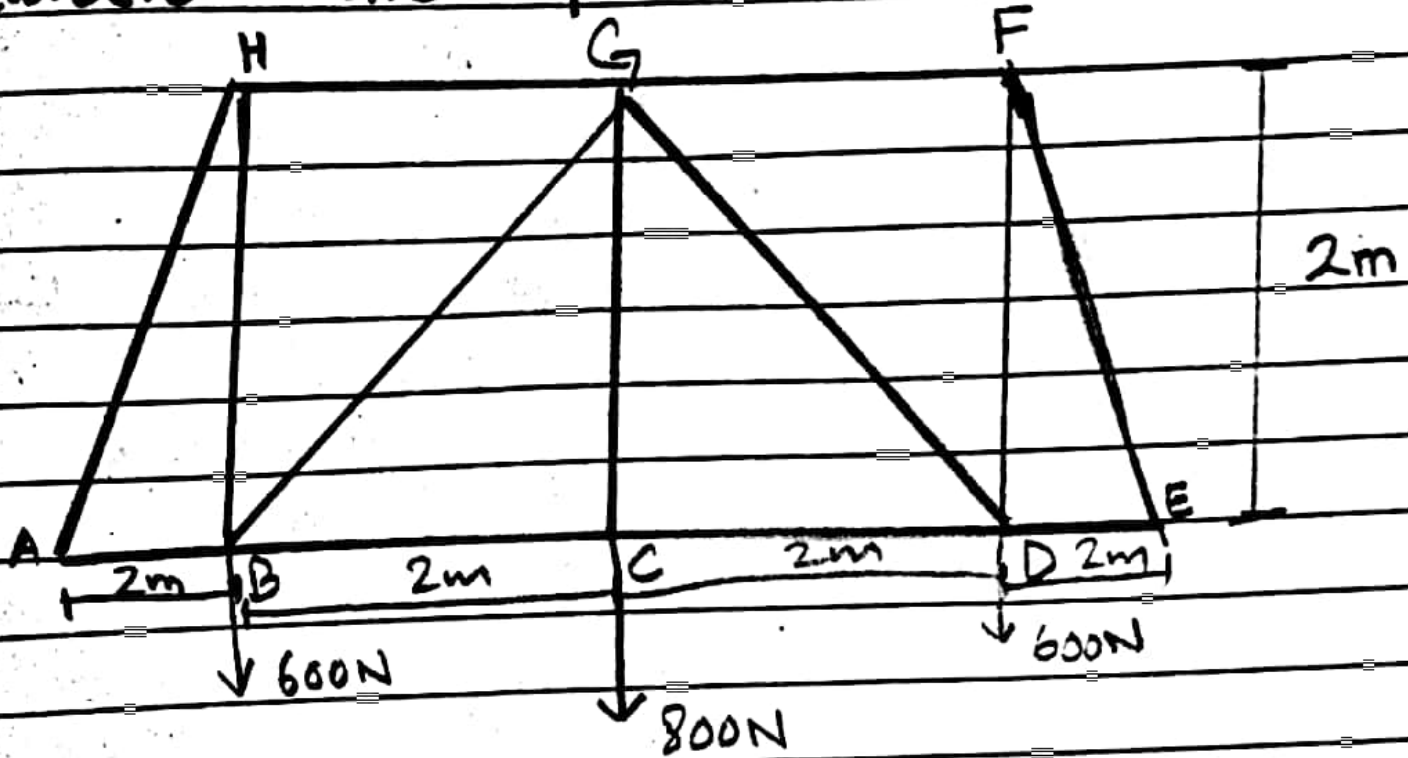
$$\uparrow \sum F_y = 0$$

$$N_B - 50 (3/5) = 0$$

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

QUESTION # 02:

⇒ Determine the force in each member of Assume all members are pin connected.



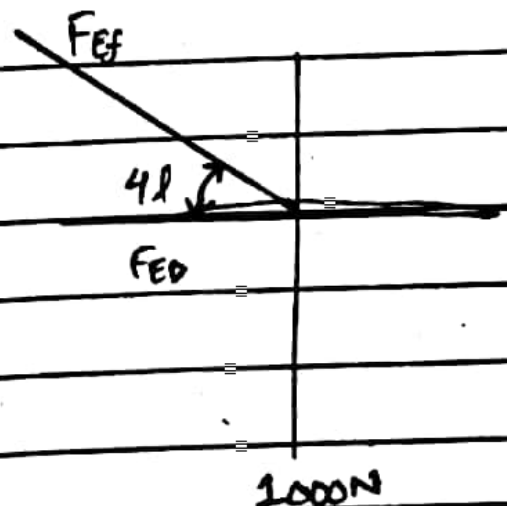
Solution:

$$\sum M_A = 0$$

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

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

Now we analyse joint "E"



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

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

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

OR

$$F_{EF} = 1.41 \text{ kN}$$

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

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

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

Now; joint "F"

$$\rightarrow \sum F_x = 0$$

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

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

F

F_{EF}

1.41 kN

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

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

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

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Now; Joint "D"

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

F_{DC}

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

OR

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

$$\rightarrow \sum F_x = 0$$

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

$$F_{DC} = 1400 \text{ N (T)}$$

OR

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

Joint "C"

$$\uparrow \sum F_y = 0$$

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

Due to symmetry:

$$F_{BE} = F_{DC} = 1.4 \text{ KN (T)}$$

$$F_{HB} = F_{ED} = 1.0 \text{ KN (T)}$$

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

$$F_{HG} = F_{EF} = 1.0 \text{ KN (T)}$$

$$F_{AH} = F_{EF} = 1.14 \text{ KN (T)}$$

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

