

## ASSIGNMENT No. 2

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DEPARTMENT : BE (CIVIL)

SECTION : "B"

SUBJECT : STRUCTURAL ANALYSIS

INSTRUCTOR : ENGR. AMJID ISLAM.

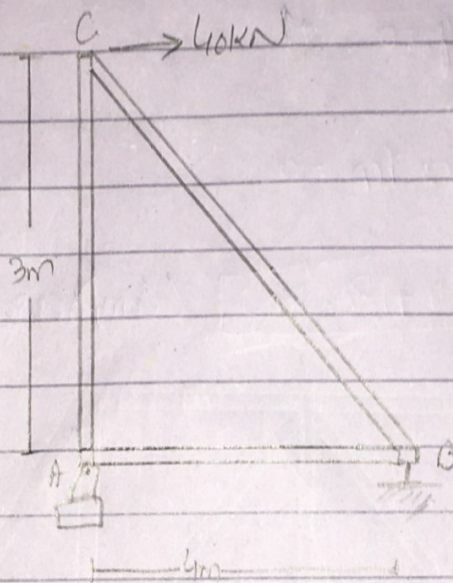


①

### QUESTION No. 1

Determine all the forces in each member---  
--- tension or Compression.

GIVEN:

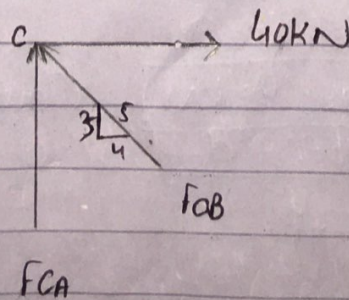


REQUIRED:

We have to find all the forces in each members.

SOLUTION:

JOINT C:



$$\sum F_x = 0 \quad \rightarrow$$



②

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

$$\Rightarrow \boxed{F_{CB} = 50 \text{ kN}} \text{ (Tension)}$$

Now

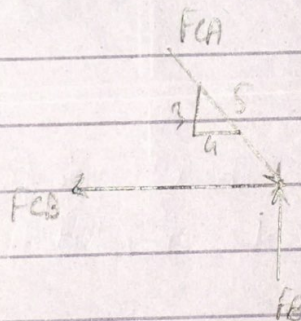
$$\sum F_y = 0 \quad \uparrow$$

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

$$\Rightarrow \boxed{F_{CA} = -30 \text{ kN}} \text{ (Compression)}$$

Now

Joint "B".



$$\sum F_x = 0 \quad \rightarrow$$

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

$$\Rightarrow \boxed{F_{BA} = 40 \text{ kN}} \text{ (Tension)}$$

$$\sum F_y = 0 \quad \uparrow$$

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



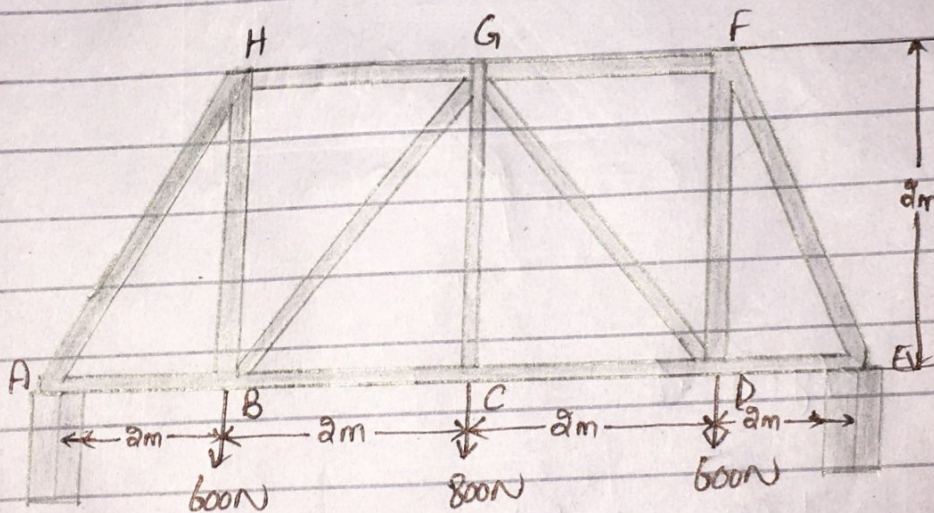
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$$\Rightarrow \boxed{F_B = 30 \text{ kN}} \quad (\text{Tension})$$

### QUESTION No.2

Determine the force in each ---  
--- members are pin connected.

GIVEN DATA:



REQUIRED DATA:

We have to find forces  
in all the members.

SOLUTION:

$$\sum M_A = 0 \quad (+)$$

$$\Rightarrow -(600 \times 2) + (-800 \times 4) + (-600 \times 6) + (F_E \times 8) = 0$$



④

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

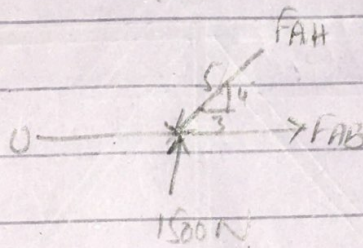
$$\sum F_y = 600 - 800 - 600 + 500 = 0$$

$$\Rightarrow \boxed{A_y = 1500 \text{ N}}$$

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

$$A_x = 0$$

Now Joint A:



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

$$\Rightarrow 1500 - F_{AH}(4/5) = 0$$

$$\Rightarrow \boxed{F_{AH} = 1875 \text{ N}}$$

Now

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

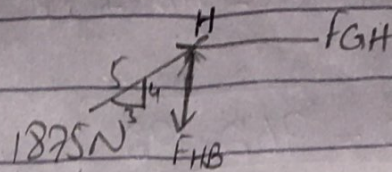
$$\Rightarrow 0 + F_{AB} - 1875(3/5) = 0$$

$$\Rightarrow \boxed{F_{AB} = 1125 \text{ N}}$$



(5)

Now  
Joint H:



$$\rightarrow \sum F_x = 0 \quad \leftarrow$$

$$\Rightarrow (3/5) 1875 - F_{GH} = 0$$

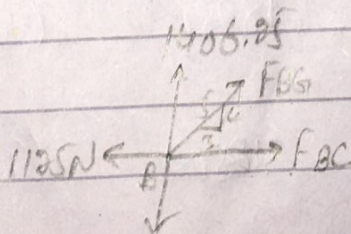
$$\Rightarrow \boxed{F_{GH} = 1125 \text{ N}}$$

$$\sum F_y = 0 \quad \uparrow$$

$$\Rightarrow -F_{HB} + (3/4) 1875 = 0$$

$$\Rightarrow \boxed{F_{HB} = 1406.25}$$

Now Joint 'B':



$$\sum F_y = 0 \quad \uparrow$$

$$\Rightarrow 1406.25 - 600 + (4/3) F_{BG} = 0$$

$$\Rightarrow \boxed{F_{BG} = 604.68}$$



(A)

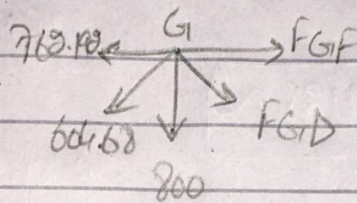
$$\sum F_x = 0 \rightarrow$$

$$\Rightarrow (3/5) 604.68 - 1125 + F_{BC} = 0$$

$$\Rightarrow \boxed{F_{BC} = 762.199}$$

Now

JOINT G.



$$\text{so } F_{GF} = 762.199$$

$$F_{GD} = 604.68$$

Now the truss are symmetrical. So;

$$F_{AH} = F_{EF} = 1875 \text{ N (Tension)}$$

$$F_{AB} = F_{ED} = 1125 \text{ N (Tension)}$$

$$F_{GH} = F_{GF} = 1125 \text{ N (Tension)}$$

$$F_{HB} = F_{AD} = 1406.25 \text{ N (Tension)}$$

$$F_{BG} = F_{DG} = 604.68 \text{ N (Tension)}$$

$$F_{BC} = F_{DC} = 762.199 \text{ N (Tension)}$$