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Assignment# 02

Date= 11/07/2020

Section= A

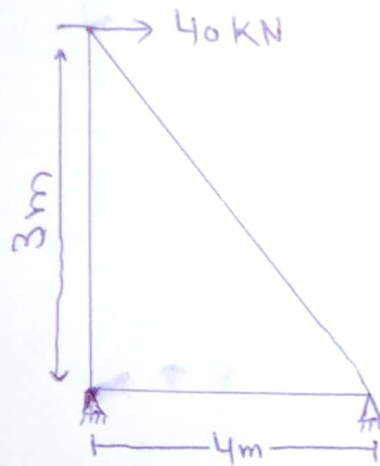
Dept = BS Civil Engineering

Semester = 04

Q # 1:- Determine the force in Each member of the truss and state whether it is tension or Compression-

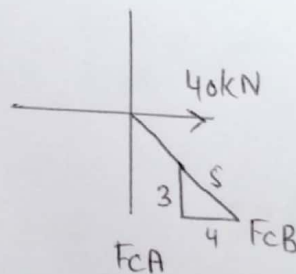
Sol:-

Given Data:-



First of all we Analyze Joint C

So,



$$\rightarrow \sum F_x = 0$$

$$40 - F_{CB} (4/5) = 0$$

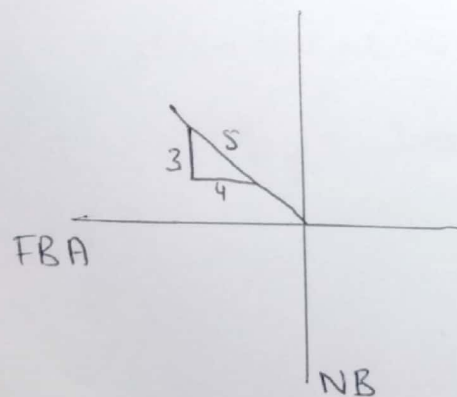
$$F_{CB} = 50.0 \text{ kN (C)}$$

$$\uparrow \sum F_y = 0$$

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

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

Now we Analyze Joint (B)



$$\rightarrow \sum F_x = 0 \quad 50 (4/5) - F_{BA} = 0$$

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

Pg#3

$$+\uparrow \sum E_y = 0$$

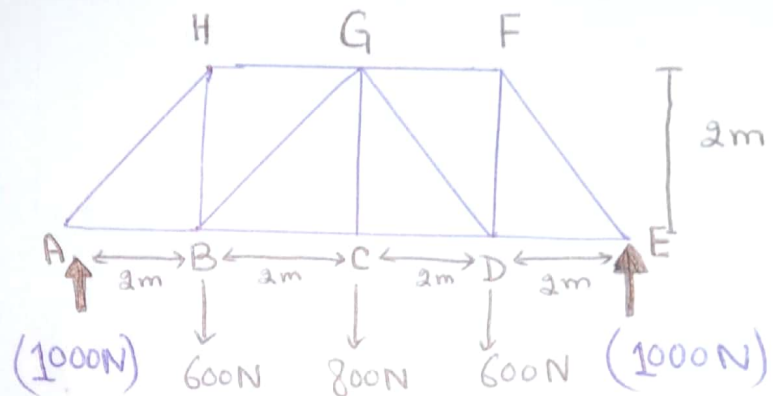
$$NB - 50 \cdot (3/5) = 0$$

$$NB = 30.0 \text{ KN}$$

Ans

Q#2:-

Given:-



Sol:-

Reactions:-

$$\sum F_y = 0$$

$$-600 - 800 - 600 + A_y + E_y = 0$$

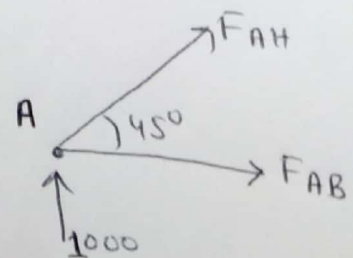
$$A_y + E_y = 2000 \text{ N} \quad \therefore A_y = E_y = 1000 \text{ N}$$

Joint A:-

$$\sum F_y = 0$$

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

$$\Rightarrow \boxed{F_{AH} = 1414.21 \text{ N (C)}}$$



$$\sum F_x = 0$$

$$\Rightarrow F_{AB} = 1414.21 \cos(45^\circ) = 0$$

$$\Rightarrow F_{AB} = 1000 \text{ N (T)}$$

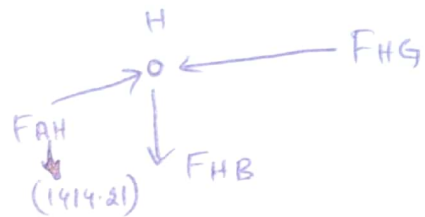
Now

Joint H :-

$$\sum F_x = 0$$

$$-F_{HG} + 1414.21 \sin(45^\circ) = 0$$

$$\therefore F_{HG} = 1000 \text{ N (C)}$$



$$\sum F_y = 0$$

$$-F_{HB} + 1414.21 \cos(45^\circ) = 0$$

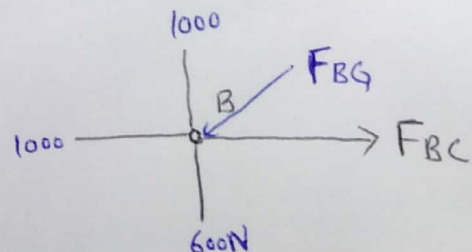
$$\therefore F_{HB} = 1000 \text{ N (T)}$$

Joint B :-

$$\sum F_y = 0$$

$$-F_{BG} \sin(45^\circ) + 1000 - 600 = 0$$

$$\Rightarrow F_{BG} = 565.68 \text{ N (C)}$$





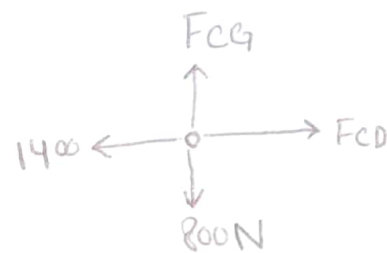
$$\sum F_x = 0$$

$$F_{BC} - 1000 - 565.68 \cos(45^\circ) = 0$$

$$\Rightarrow \boxed{F_{BC} = 1400 \text{ N}}$$

Joint C:

$$\sum F_x = 0$$



$$F_{CD} - 1400 = 0 \quad \therefore \boxed{F_{CD} = 1400 \text{ (T)}}$$

$$\sum F_y = 0$$

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

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

Due to Symmetry

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

$$F_{DG} = F_{BG} = 565.68 \text{ N (C)}$$

$$F_{FD} = F_{HB} = 1000 \text{ N (T)}$$

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

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

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

