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Section:- 'A'

Semester 4th (BE(C))

Subject:- Structure Analysis-I

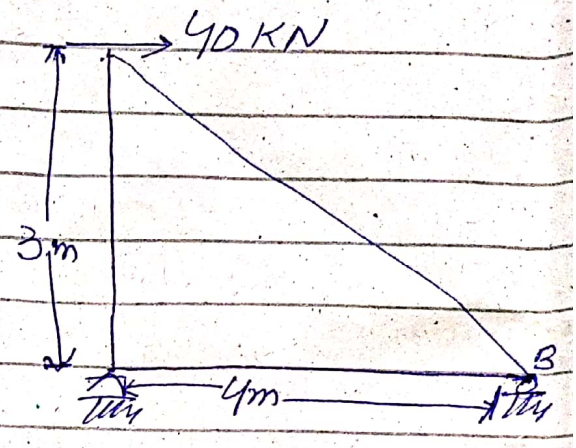
Assignment No: 02.

Submitted to:- Sir Majid Ul Islam

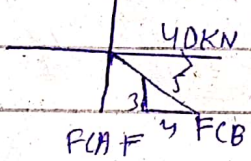
Date:- 11/07/2020

Q No.1:- Determine force at each member of the truss and state wether it's tension or compresion.

Sol:- Given figure



• Joint analysis; at (C)



$\Sigma F_x = 0 \quad (\xrightarrow{+})$

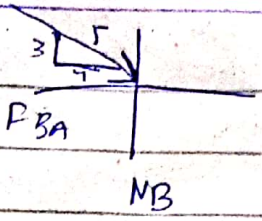
$40 - F_{CB}\left(\frac{4}{5}\right) = 0$

$\Rightarrow \boxed{F_{CB} = \frac{5}{4}\,50\ KN}$ (compression)

$\Sigma F_y = 0 \quad (\uparrow^{+})$

$50\left(\frac{3}{5}\right) - F_{CA} = 0 \Rightarrow \boxed{F_{CA} = 30\ KN}$ (Tension)

Joint analysis at B:



$\sum F_x = 0 \quad (\pm\rightarrow)$

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

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

$\sum F_y = 0 \quad (\uparrow^+)$

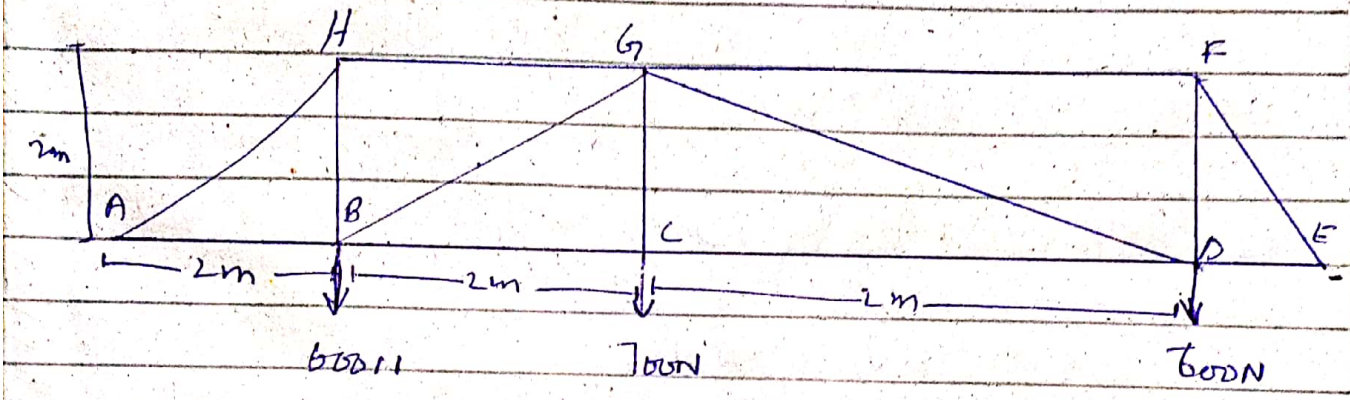
$N_B - 50.0\left(\frac{3}{5}\right) = 0$

$\Rightarrow N_B = 30\ kN$ (Compression)

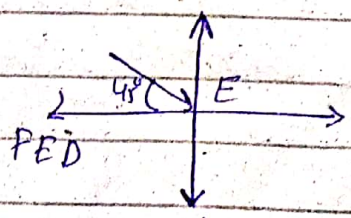
Question No. 02

Determine the force in each member of the truss. Indicate if the member is in Tension or Compression. Assume all members are pin connected.

Sol:- Given figure.



* Analyzing Joint (E)



$\Sigma F_y = 0 \quad (\uparrow +)$

$1000 - F_{EF} \sin 45° = 0$

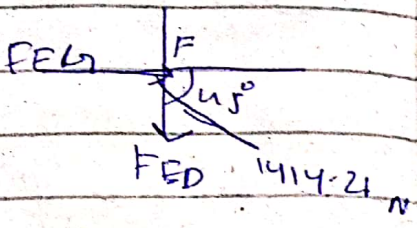
$\Rightarrow F_{EF} = 1414.2\ N \Rightarrow \boxed{F_{EF} = 1.41\ KN}$ (Compression)

$\Sigma F_x = 0 \quad (\pm)$

$\Rightarrow 1414.21 \cos 45° - F_{ED} = 0$

$\Rightarrow \boxed{F_{ED} = 1\ KN}$ (Tension)

* Analyzing Joint (F)



$\Rightarrow \sum F_x = 0 \quad (\xrightarrow{+})$

$\Rightarrow F_{FG} - 1414.21 \cos 45° = 0$

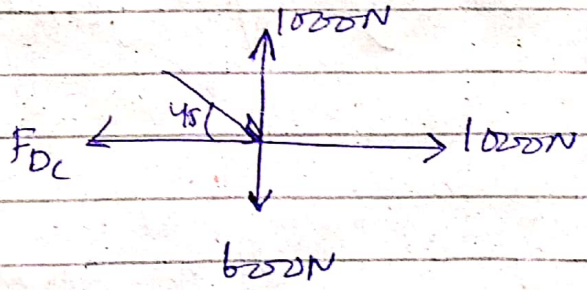
$\Rightarrow \boxed{F_{FG} = 1\,kN}$ (Compression)

$\sum F_y = 0 \quad (\uparrow + \downarrow -)$

$1414.21 \sin 45° - F_{ED} = 0$

$\boxed{F_{FD} = 1000\,N \text{ or } 1\,kN}$ (Tension)

* Joint 'D' :-



$\Rightarrow \sum F_y = 0$

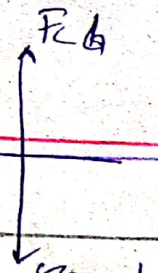
$\Rightarrow 1000 - 600 - F_{DG} \sin 45° = 0$

$\boxed{F_{DG} = 566\,N}$ (Compression)

$\sum F_x = 0 ; \quad 1000 + 566 \cos 45° - F_{DC} = 0$

$\Rightarrow \boxed{F_{DC} = 1.4\,kN}$ (Tension)

* Joint 'C':



$\Sigma F_y = 0$

$F_{CG} - 800 = 0$

$\Rightarrow \boxed{F_{CG} = 800\,N}$ (tension)

Due to Symmetery in figure;

$F_{BC} = F_{DC} = 1.4\,KN$ (Tension)

$F_{HB} = F_{FD} = 1\,KN$ (Tension)

$F_{BG} = F_{DG} = 566\,N$ (Tension)

$F_{HG} = F_{FG} = 1\,KN$ (compression)

$F_{AH} = F_{EF} = 1.41\,KN$ (compression)

$F_{AB} = F_{ED} = 1.6\,KN$ (Tension).