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Section :- "A"

ID :- 7906

Subject :- Structure - I

Assignment :- 02

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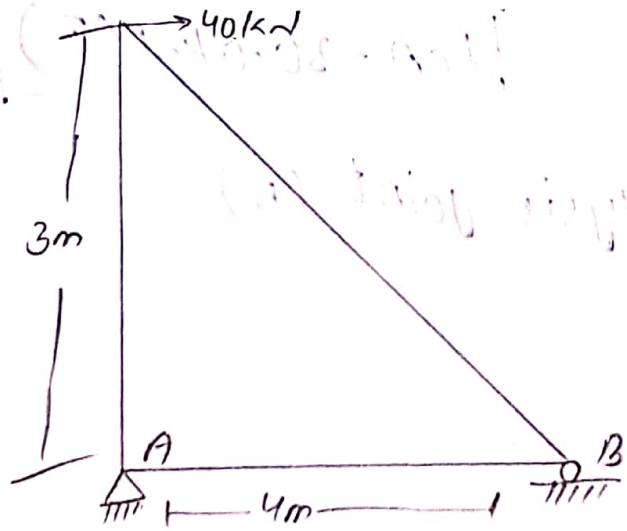
Question #01

Determine the force in Each member of the truss and state coether it is in tension or Compression -

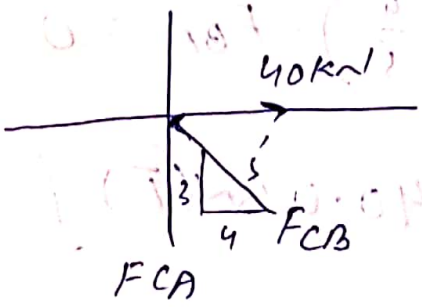
Solution:-

Given that



First of all we analysis Joint (C)

60,



$\xrightarrow{+} \Sigma F_x = 0$

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

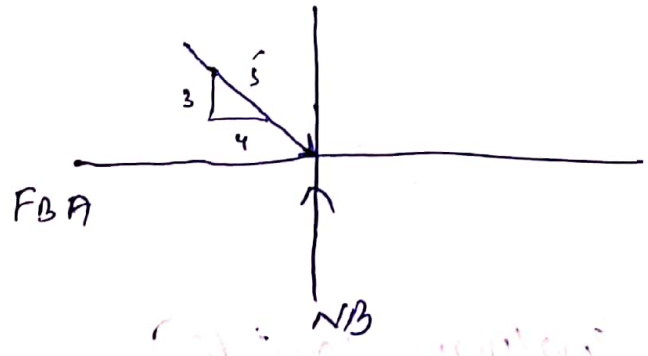
$\boxed{F_{CB} = 50.0\,kN\ (C)}$

$+\uparrow \Sigma F_y = 0$

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

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

Now we analysis joint (B)



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

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

$+\uparrow \Sigma F_y = 0 \quad N_B - 50.0\left(\frac{3}{5}\right) = 0$

$N_B = 30.0\,kN$

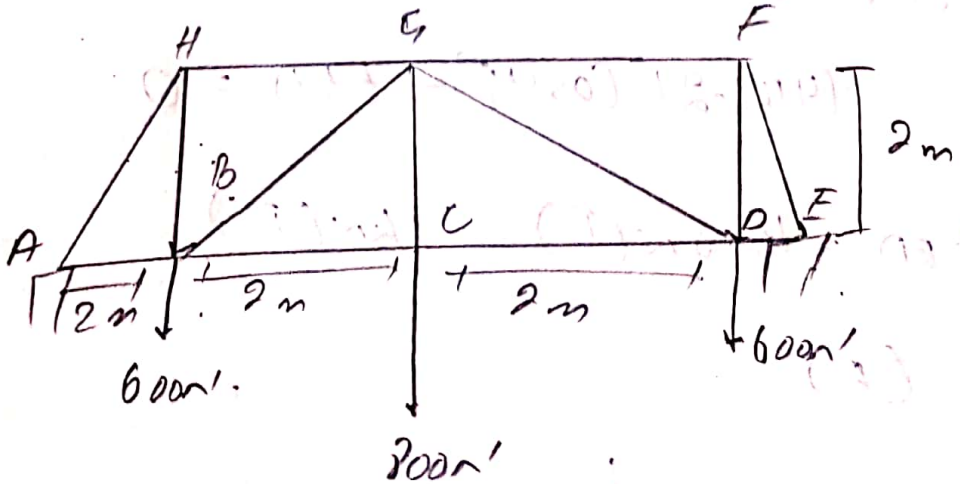
$\Sigma F_x = 0 \rightarrow$

QUESTION # 02

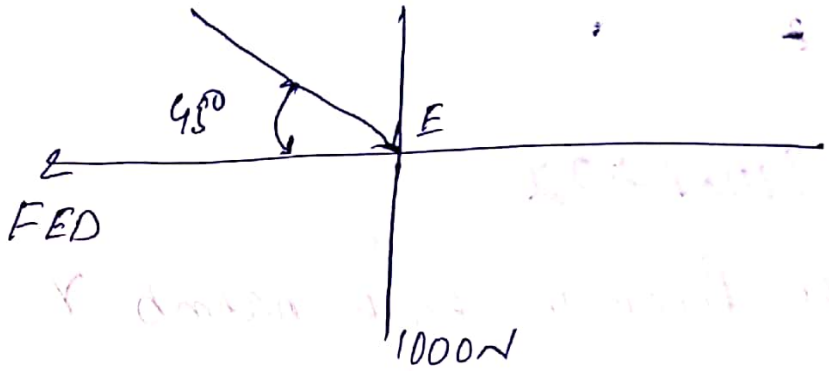
Determine the force in each member of the truss. Indicate if the member are in tension OR compression. Assume all members are pin connected.

SOLUTION:-

Given that:-



Now we analyse Joint (E)



$+\uparrow \Sigma F_y = 0$;

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

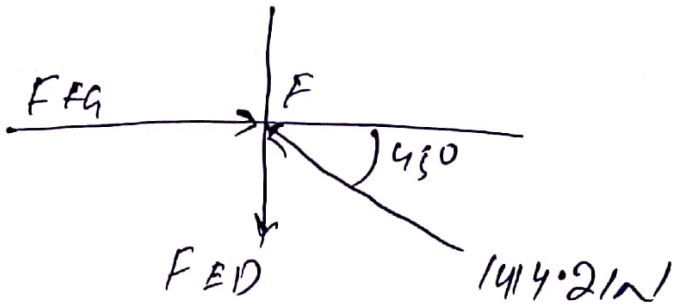
$F_{EF} = 1414.21N\,(C) = 1.411kN\,(C)$

$\xrightarrow{+} \Sigma f_x = 0$;

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

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

Joint (F)



$\xrightarrow{+} \Sigma F_x = 0$

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

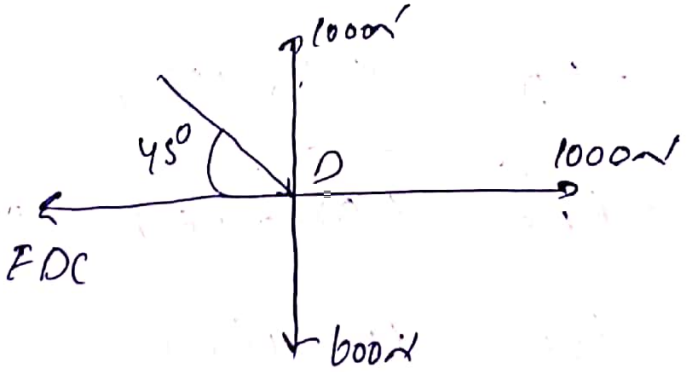
$\boxed{F_{FG} = 1000 N (C) = 1 kN (C)}$

$+\uparrow \Sigma F_y = 0;$

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

$F_{FD} = 1000 N (T) = 1 kN (T)$

Joint (D)



$\uparrow \Sigma F_y = 0$

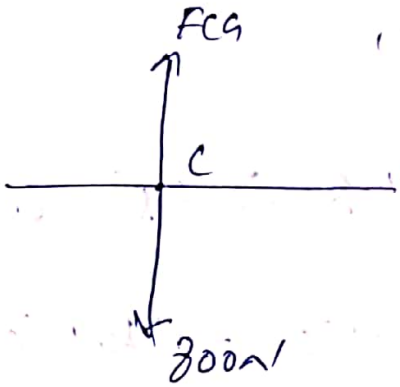
$1000 - 600 - F_{DG} \sin 45^\circ = 0$

$F_{DG} = 565.69 N (C) = 566 N (C)$

$\xrightarrow{+} \Sigma F_x = 0; \quad 1000 + 565.69 \cos 45^\circ - F_{DC} = 0$

$\boxed{F_{DC} = 1400 N (T) = 1.41 kN (T)}$

Joint (C)



$+\uparrow \Sigma F_y = 0$

$F_{CG} - 300 = 0$

$F_{CG} = 300N (T)$

Due to symmetry:

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

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

$F_{BG} = F_{DG} = 5.66N (T)$

$F_{HG} = F_{FG} = 1.0kN (C)$

$F_{AH} = F_{EF} = 1.41kN (C)$

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

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