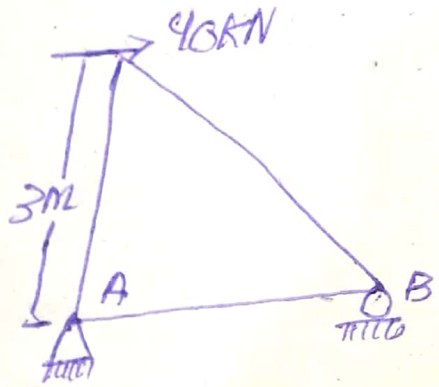
Question NO 1.

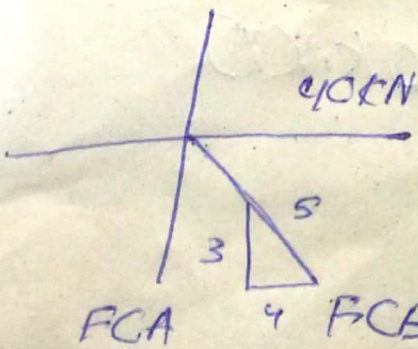
Determine the force in each member of the truss and state whether it is in tension or compression.

Sol:-

Given That:-



First of all we analysic joint (C) at 60°



(2)

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

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

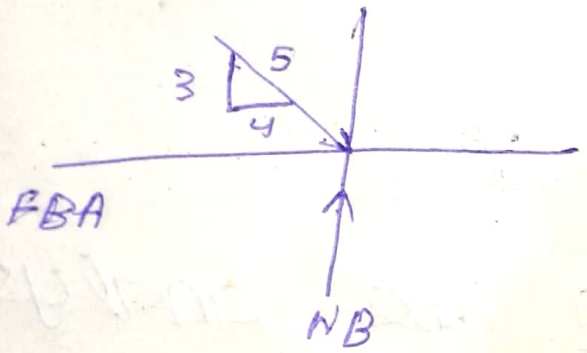
$F_{CB} = 50.0\,kN\ (C)$

$+\uparrow \Sigma F_y = 0$.

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

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

Now joint analysis (B)



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

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

$+\uparrow \Sigma F_y = 0$.

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

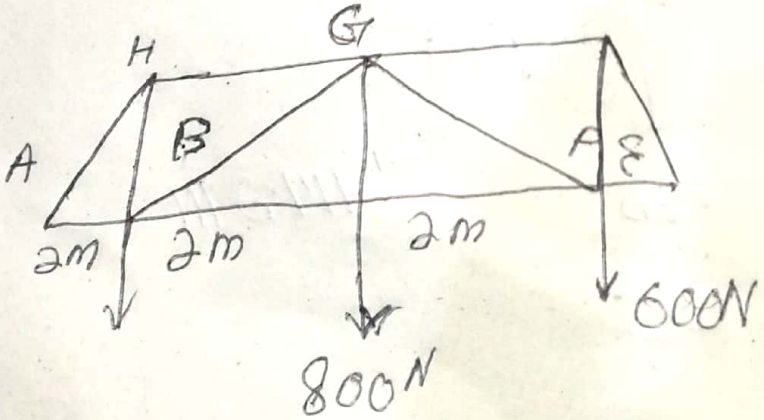
NB = 30.6 KN.

Q2:-

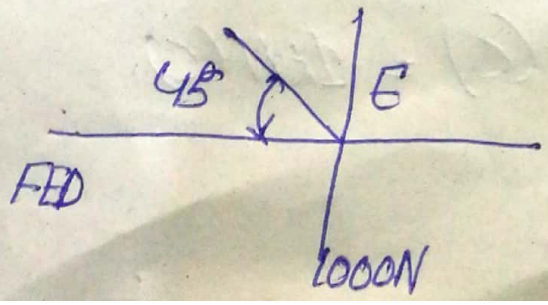
Determine the force in each member at the truss. Indicate it the member are in tension or compression assume all members are pin connection.

SOL^{n}:-

Given:-



NOW we analysic joint (E)



$+\uparrow \Sigma F_y = 0$;

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

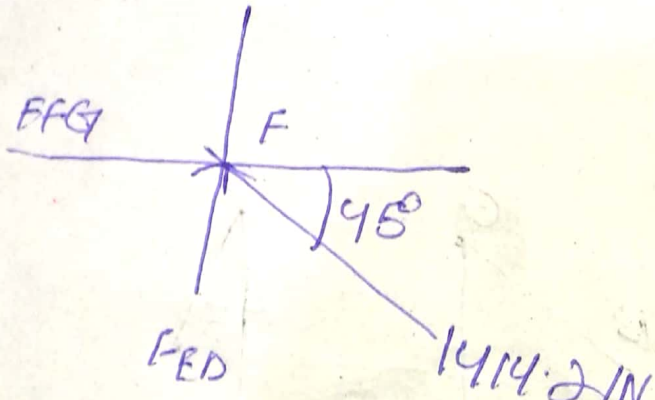
$F_{EF} = 1414.21\,N\,(C) = 1.41\,kN\,(C)$.

$\rightarrow \Sigma F_x = 0$.

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

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

Joint (F).



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

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

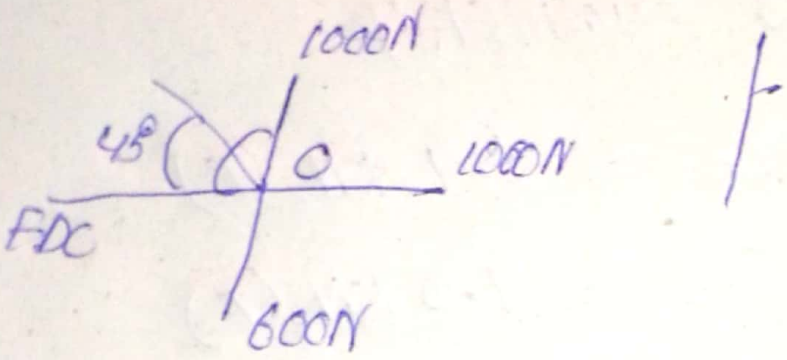
$F_{FG} = 1000\,N\,(C) = 1\,kN\,(C)$.

$+\uparrow \Sigma F_y = 0$;

1414.21 Sin 45° − F_{ED} = 0.

F_{FD} = 1000N (T) ≈ 1 kN (T)

Joint (D).



↑ Σ F_y = 0.

1000 − 600 − F_{DG} Sin 45° = 0.

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

→ Σ F_x = 0; 1000 + 565.59 cos 45° − F_{DC} = 0

F_{DC} = 1400N (T) ≈ 1.4N (T).

Joint (F)

$+\uparrow \Sigma F_y = 0$

$F_{CG} - 800 = 0$

$F_{CG} = 800 N (I)$.

Due to symmetry.

$F_{BC} = F_{DC} = 1.9 \text{ KN } (T)$

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

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

$F_{HG} = F_{FG} = 1.0 \text{ KN } (C)$

$F_{AH} = F_{EF} = 1.41 \text{ KN } (C)$

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