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Assignment :- Structure Analysis.

Date :- 11 July 2020

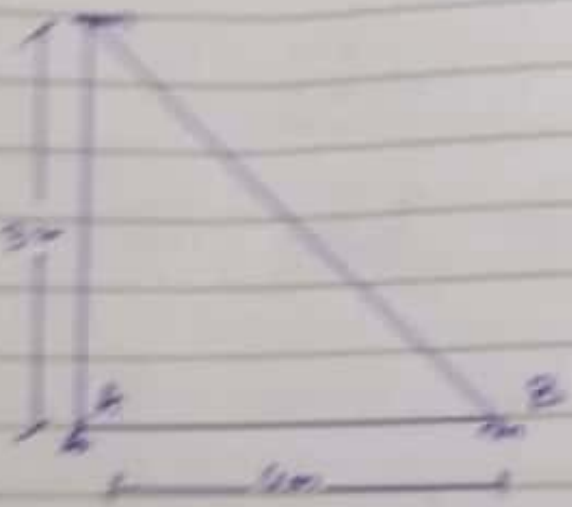
Section :- A

Question # 01

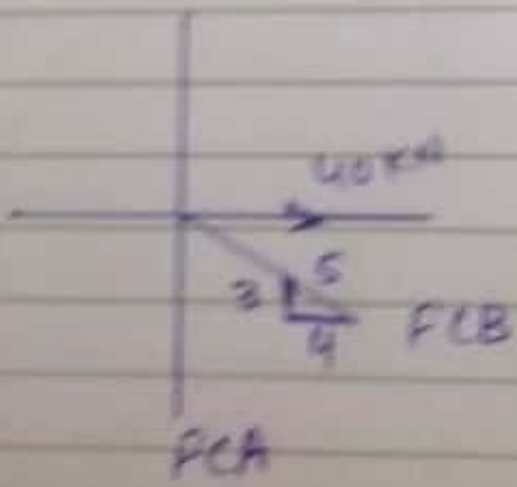
→ Determine the force in each member of the truck & state whether it is in tension or compression.

Sol:

Given truel



First of all we analyse joint (c) so,



Date:

(2)

$\rightarrow \sum F_x = 0$

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

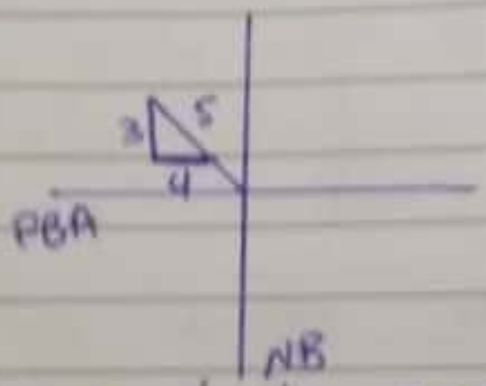
$\boxed{F_{CB} = 50.0\,KN\,(C)}$

$+\uparrow \sum F_y = 0$

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

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

Now we analyse joint (B)



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

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

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

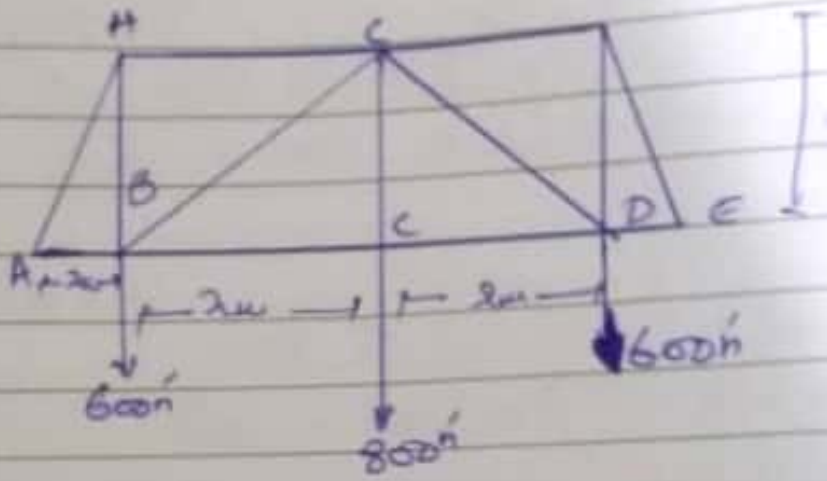
$\boxed{N_B = 30.0\,KN}$

Q NO: 2:

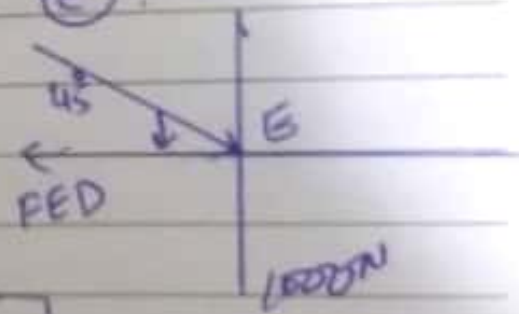
Determine the force in each member of the truss indicate if the members are in tension or compression. Assume all members are pin connected.

Sol:-

Given that:



Now we analys joint (E).



$+\uparrow \Sigma F_y = 0$

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

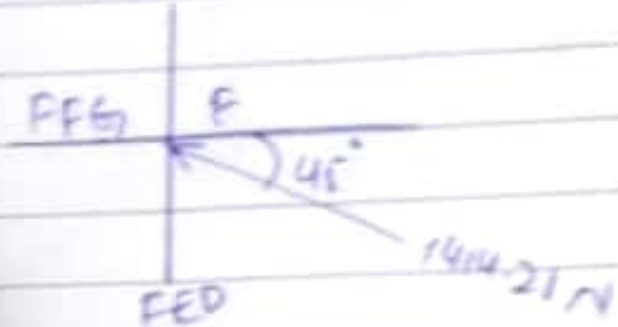
$$F_{EF} = 1414.21\,N\,(C) = 1.41\,kN\,(C)$$

$\rightarrow \sum F_x = 0$

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

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

Joint (F)



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

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

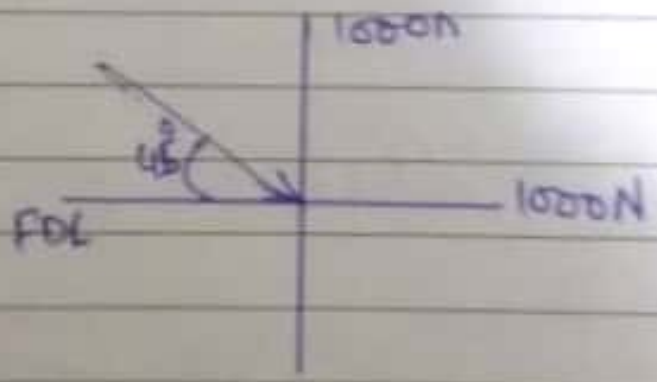
$F_{FG} = 1000\ N(C) = 1\ kN(C)$

$+\uparrow \sum F_y = 0$

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

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

Joint (D)



$+\uparrow \sum F_y = 0$

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

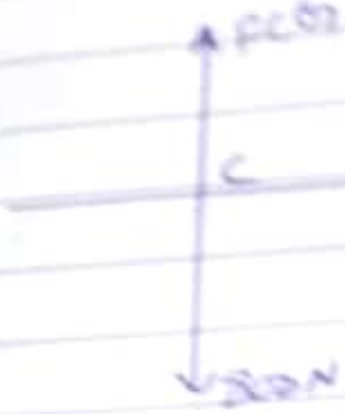
$F_{DG} = 565.69\ N\ (C) = 566\ N\ (C)$

$\pm \rightarrow \sum F_x = 0$

$1000 - 565.69 \cos 45^\circ - F_{DC} = 0$

$F_{DC} = 1400\ N\ (T) = 1.4\ kN\ (T)$

Joint (C)



$+\uparrow \sum F_y = 0$

$F_{CG} - 800 = 0$

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

Due to Symmetry.

$F_{BC} = F_{DE} = 1.4\ kN\ (T)$

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

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

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

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

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