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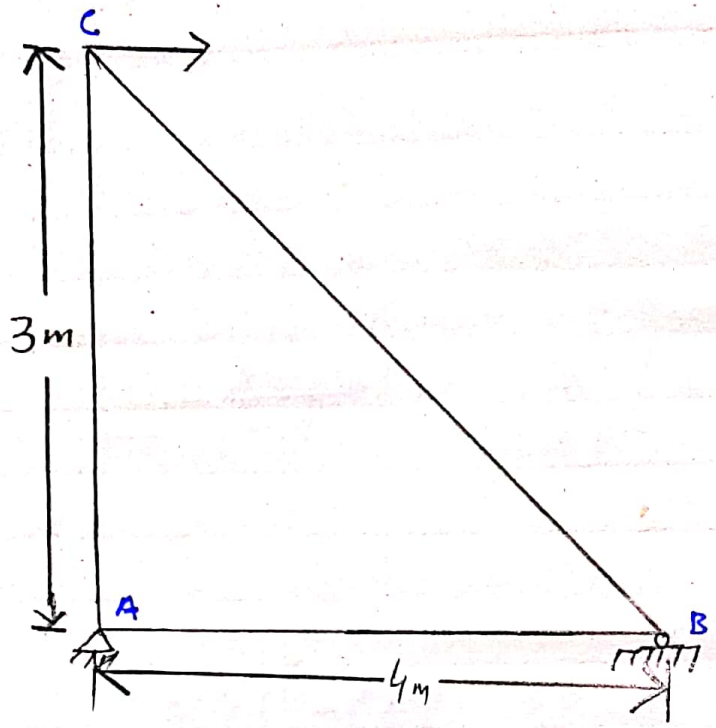
Section # 13

Deptt # BE Civil Engg.

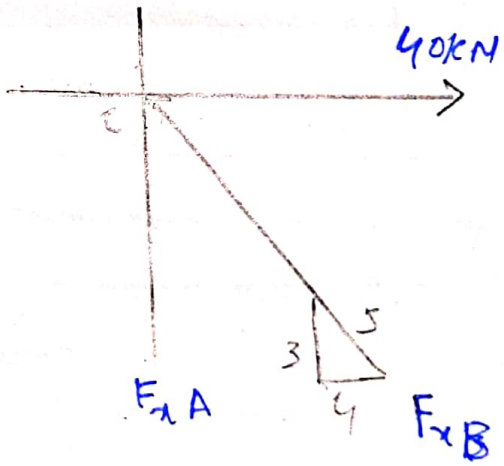
Subject # Structural Analysis(I)

Assignment # 01.

Q#1



First of all analyse Joint (C)



$+\sum F_x = 0$

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

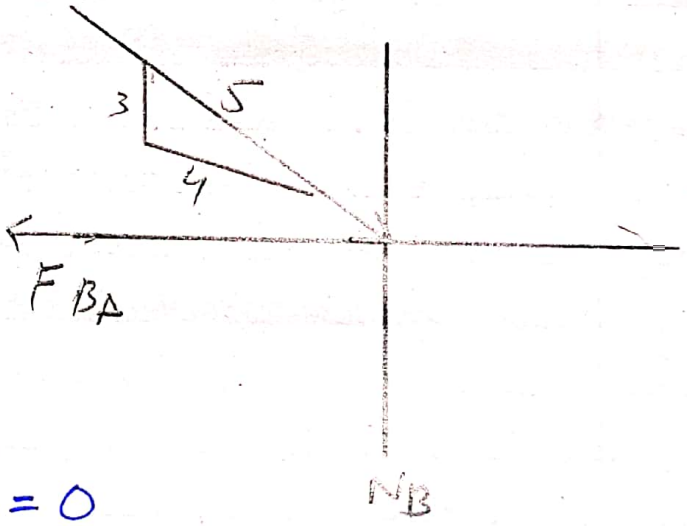
$F_{CB} = 50.0\ kN\ (C)$

$+\uparrow \Sigma F_y = 0$

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

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

Now we analyse joint (B)



$\pm \rightarrow \Sigma F_x = 0$

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

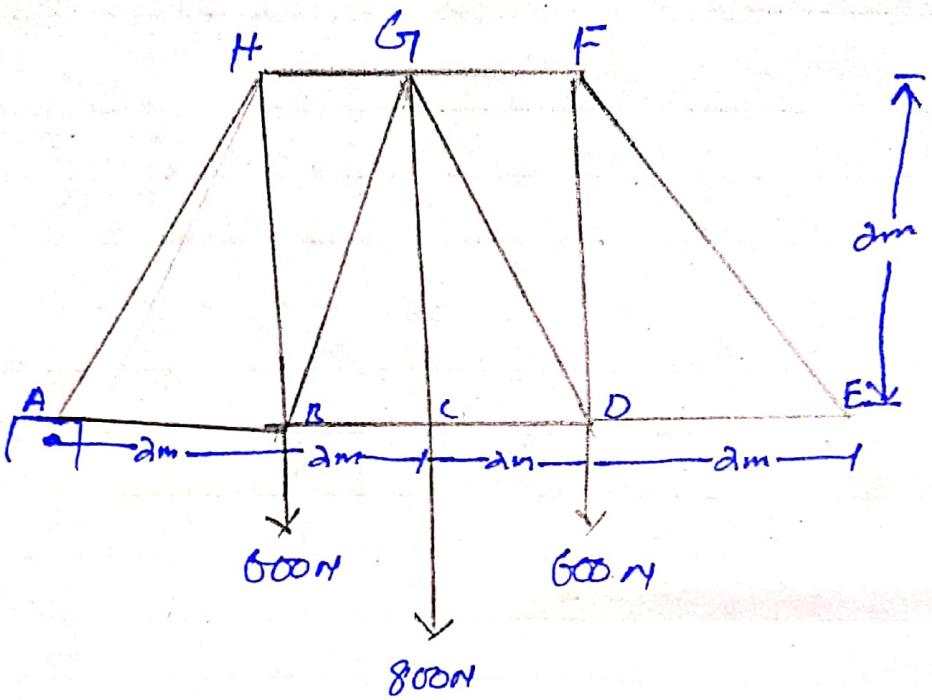
$$F_{BA} = 40.0\ KN(T)$$

$+\uparrow \Sigma F_y = 0$

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

$$N_B = 30.0\ KN$$

Q#2

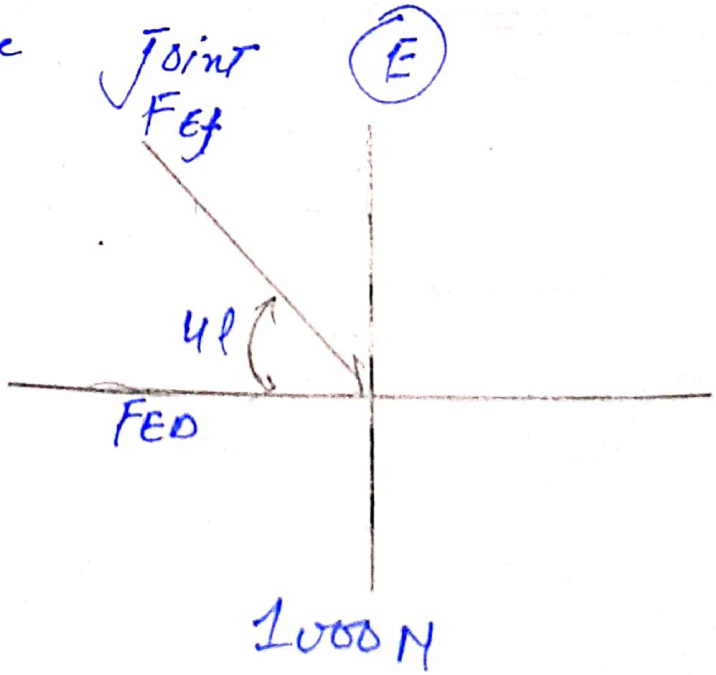


$G + \Sigma M_A = 0$

$E_y(8) - 600(2) - 800(4) - 600(6) = 0$

$\boxed{E_y = 1000N}$

Now we analyse Joint (E)



$+\uparrow \Sigma f_y = 0;$

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

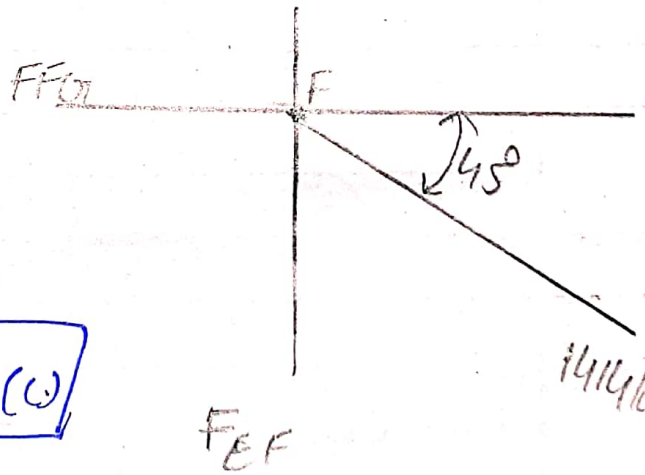
$\boxed{F_{EF} = 1414.21\ N\ (C)}$ OR $\boxed{1.41\ kN}$

$\pm\rightarrow \Sigma F_x = 0;$

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

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

Joint (F)



$\pm\rightarrow \Sigma F_x = 0;$

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

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

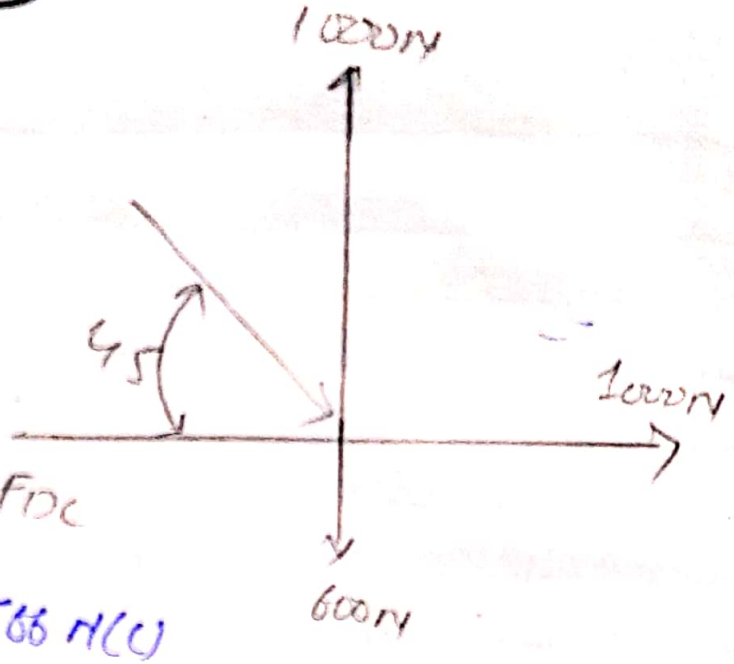
$+\uparrow \Sigma f_y = 0;$

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

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

(5)

Joint D



$+\uparrow \Sigma F_y = 0;$

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

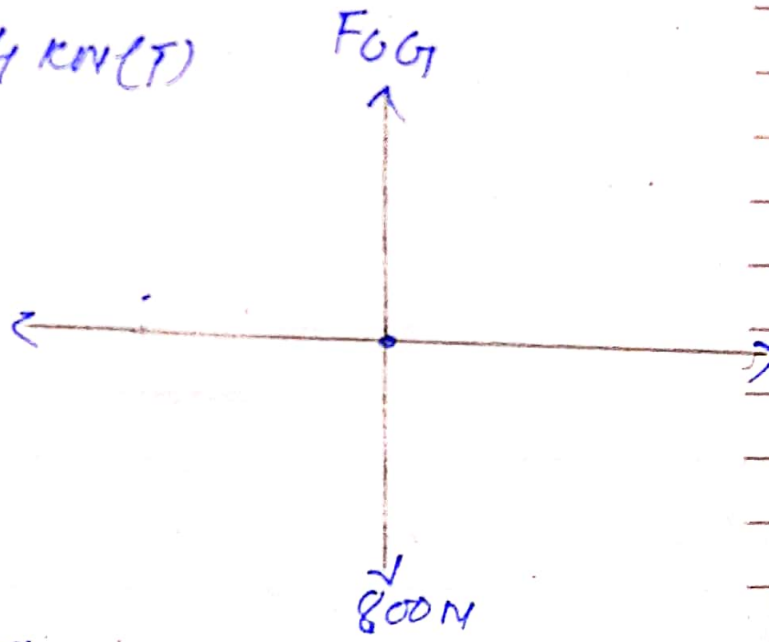
$F_{DG} = 565.69\ N(C) = 566\ N(C)$

$\pm\rightarrow \Sigma f_x = 0;$

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

$f_{DC} = 1400\ N(T) - 1.4\ KN(T)$

Joint C



$+\uparrow \Sigma f_y = 0$

$f_{CG} = 800N(T)$

Due to symmetry

$F_{BE} = F_{DC} = 1.4\ KN(T)$

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

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

$F_{BG} = F_{DG} = 566\ KN(T)$

$F_{HG} = F_{GF} = 1.0 KN(T)$

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