9.5/10

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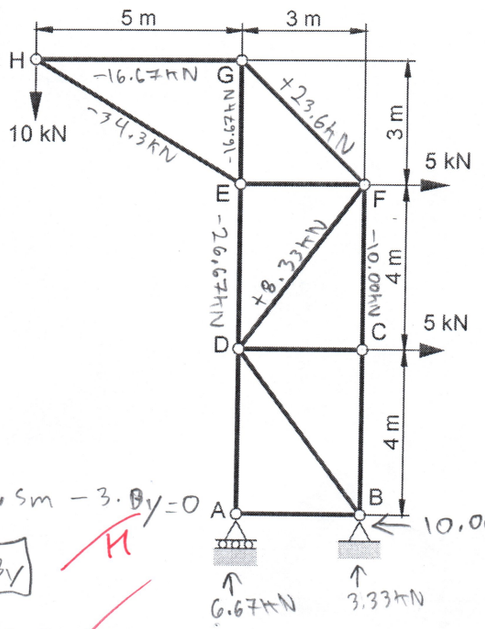
(Last) (First)

CIV102F Quiz # 6: 1300h-1500h Thursday October 17, 2019

Analysis of Trusses

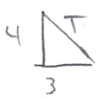
(a) Determine the support reactions at A and B.
(b) Using the method of joints determine the forces in members HG, HE, GE and GF.
(c) Using the method of sections determine the forces in members ED, DF, and CF.

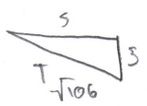
Write the calculated member loads on the diagram of the truss. Use (+) for tension and (-) for compression.

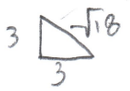


+Y
+V
+X

$\Sigma F_x = 0$
$\Sigma F_y = 0$
$\Sigma M = 0$







$\Sigma F_x = \frac{5}{3} F_y$

$F_T = \frac{\sqrt{106}}{3} F_y$

$F_T = F_y \frac{\sqrt{18}}{3}$

a.) $\Sigma M_A = 5.8m + 5.4m - 10.5m - 3.B_y = 0$

$B_y = \frac{10}{3}$ kN = 3.33 kN = B_y

$\Sigma M_B = 5.8 + 5.4 - 10 \cdot 8 + 3 \cdot A_y = 0$

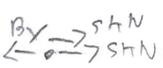
$A_y = \frac{20}{3}$ kN = 6.67kN = A_y

$A_x = 0$ kN

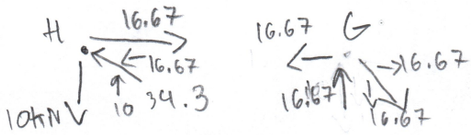
$\Sigma F_x = 0 = 5kN + 5kN - B_x$

$B_x = 10$ kN

$B_x = 10.00$kN

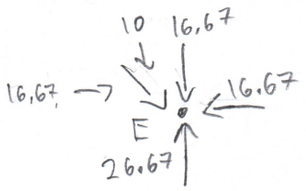


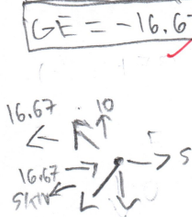
b.)



HG = −16.67kN
HE = −34.3kN
GE = −16.67kN
GF = +23.6kN

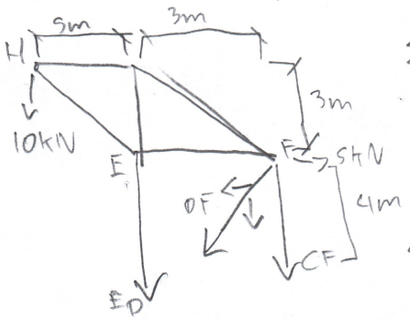
calc error. $\sqrt{10^2 + 16.67^2} = -19.444$kN





dont need.

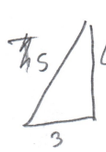
c.)



$\Sigma M_F = -10kN \cdot 8m - ED \cdot 3m = 0$

$ED = -26.67$kN

ED = −26.67kN



$\frac{4}{3} = \frac{DF_y}{DF_x}$

$DF_y = \frac{4}{3} DF_x$

$DF_T = \frac{5}{3} DF_x$

$\Sigma F_x = 5kN - DF_x = 0$

$DF_x = 5kN \Rightarrow DF_y = 6.67kN$

DF = +8.33kN

$\Sigma F_y = 0 = -10kN - DF_y - CF - ED$

$0 = -10kN - 6.67kN - CF + 26.67kN$

$CF = -10kN$

CF = −10.00kN