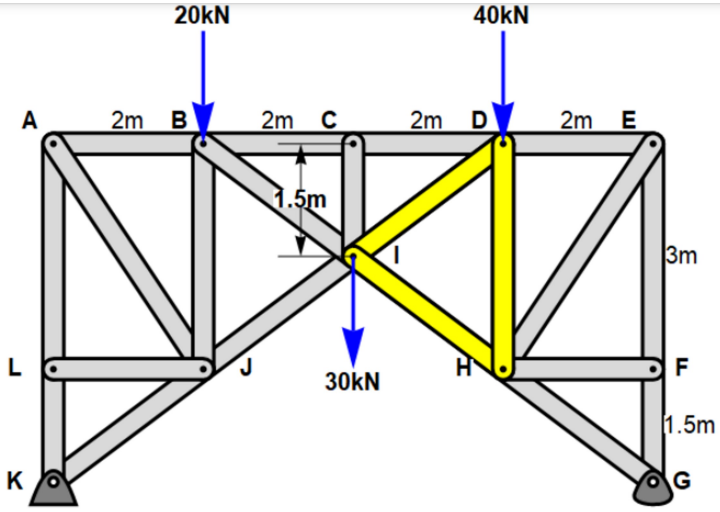
Final Exam Problem 1

Friday, December 18, 2020 7:56 AM

1. Determine the internal forces in the highlighted members (DI, HI, DH) and state whether they are in tension or compression. To receive full credit you must show all work.



$\sum F_x = 0$

$H_x = 0$

$\sum F_y = 0$

$H_y + G_y - 90 = 0$

$H_y + G_y = 90$

$\sum M_H = 0$

$-20(2) - 30(4) - 40(6) + G_y(8) = 0$

$G_y = 50\ kN$

$H_y + 50 = 90$

$H_y = 40\ kN$

$\overline{DI} = \sqrt{(2)^2 + (1.45)^2}$

$\overline{DI} = 2.5$

$\sum F_x = 0$

$CD + DE = 0$

$\sum F_y = 0$

$-40 + 50 - F_{DH} = 0$

$F_{DH} = 10\ kN$ In tension

$\sum F_y = 0$

$-40 - 10 + F_{DI}\left(\frac{1.5}{2.5}\right) = 0$

$F_{DI} = 83.33$

In compression

$F_{HI} + F_{DI} = 0$

$F_{HI} = -F_{DI}$

$F_{HI} = 83.33$

In tension