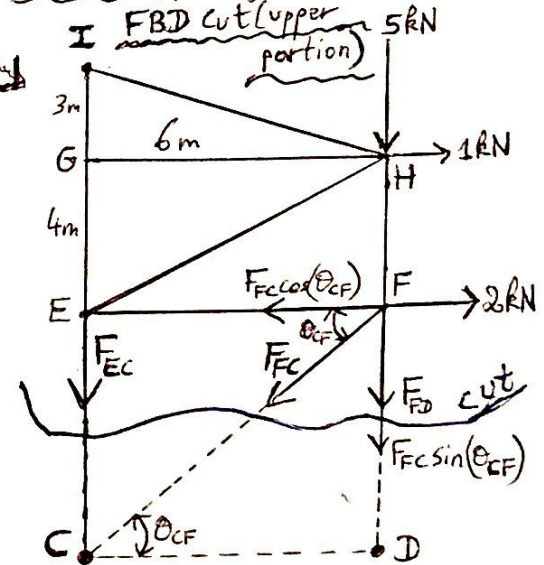
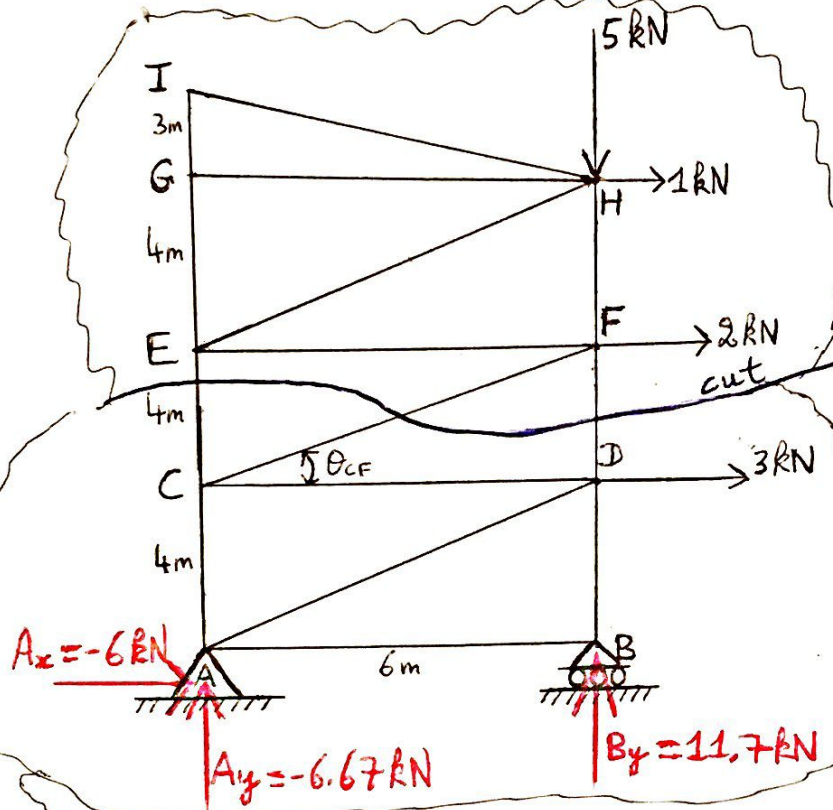


Date: 5<sup>th</sup> December 2020

Find:  $F_{EC}$ ,  $F_{CF}$  and  $F_{DF}$

$$\theta_{CF} = \tan^{-1}\left(\frac{4m}{6m}\right) = 33.69^\circ$$

Fastest way to solve the problem  
(without finding the reactions)



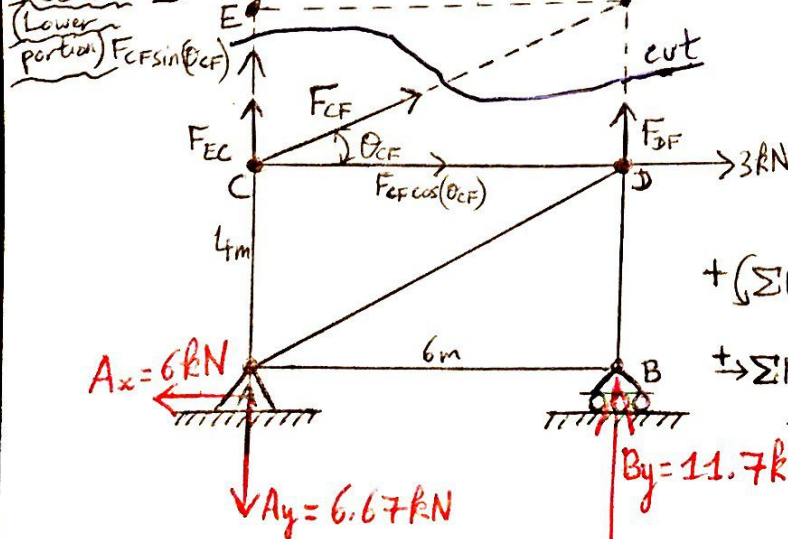
$$\rightarrow \sum F_x = 0; A_x + 3 + 2 + 1 = 0 \Rightarrow A_x = -6kN = 6kN \leftarrow$$

$$\uparrow \sum M_A = 0; (B_y)(6m) + (-3kN)(4m) + (-2kN)(8m) + (-1kN)(12m) + (-5kN)(6m) = 0$$

$$B_y = 11.7kN$$

$$\uparrow \sum F_y = 0; A_y + B_y = 5kN$$

$$FBD \text{ cut } \rightarrow A_y = 5 - 11.7 = -6.67kN = 6.67kN \downarrow$$



$$\uparrow \sum M_F = 0; (F_{EC})(6m) + (-1kN)(4m) = 0$$

$$F_{EC} = 0.67kN (T)$$

$$\rightarrow \sum F_x = 0; 2 + 1 - F_{CF} \cos(33.69) = 0$$

$$F_{CF} = 3.606kN (T)$$

$$\uparrow \sum F_y = 0; F_{EC} + F_{DF} + F_{CF} \sin(\theta_{CF}) + 5 = 0$$

$$(0.67) + F_{DF} + [3.606 \sin(33.69)] + 5 = 0$$

$$F_{DF} = -7.7kN = 7.7kN (C)$$

$$\uparrow \sum M_C = 0; (F_{DF})(6m) + (11.7kN)(6m) - (6kN)(4m) = 0$$

$$F_{DF} = -7.7kN = 7.7kN (C) \checkmark$$

$$\rightarrow \sum F_x = 0; (3kN) + [F_{CF} \cos(33.69)] - 6 = 0 \Rightarrow F_{CF} = 3.606kN (T) \checkmark$$

$$\uparrow \sum F_y = 0; F_{EC} + F_{DF} + F_{CF} \sin(\theta_{CF}) - A_y + B_y = 0$$

$$F_{EC} + (-7.7) + [3.606 \sin(33.69)] - (-6.67) + (11.7) = 0$$

$$F_{EC} = 0.67kN (T) \checkmark$$