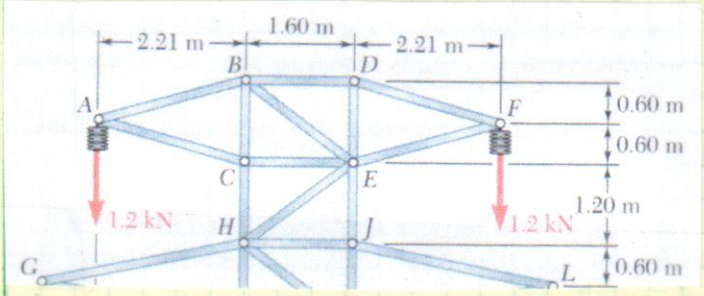
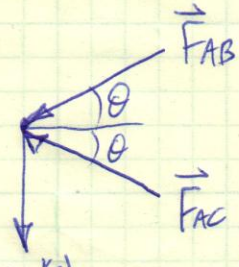
PROB. 6-23



POINT A:

$$\theta = \tan^{-1}\left(\frac{0.6}{2.21}\right) = 15.19°$$



$$\vec{F}_{AB} = (-F_{AB}\cdot\cos 15.19°)\hat{i} + (-F_{AB}\cdot\sin 15.19°)\hat{j}$$

$$\vec{F}_{AB} = (-0.9651\,F_{AB})\hat{i} + (-0.262\,F_{AB})\hat{j}\ \text{kN}$$

$$\vec{F}_{AC} = (-0.9651\,F_{AC})\hat{i} + (0.262\,F_{AC})\hat{j}\ \text{kN}$$

$$\Sigma F_x = 0: \quad -0.9651\,F_{AB} - 0.9651\,F_{AC} = 0 \Rightarrow F_{AB} = -F_{AC}$$

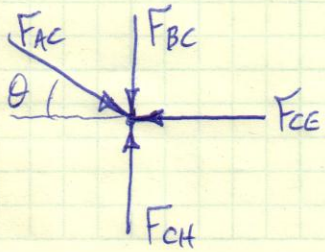
$$\Sigma F_y = 0: \quad -1.2 - 0.262\,F_{AB} + 0.262\,F_{AC} = 0$$

$$-0.262(-F_{AC}) + 0.262\,F_{AC} = 1.2$$

$$\boxed{F_{AC} = 2.29\ \text{kN}\ (C) = F_{EF}}$$

$$\boxed{\vec{F}_{AB} = -2.29\ \text{kN}\ (T) = F_{DF}}$$

POINT C:



$$\vec{F}_{AC} = (0.9651\cdot 2.29)\hat{i} + (-0.262\cdot 2.29)\hat{j}$$

$$\vec{F}_{AC} = (2.21)\hat{i} + (-0.6)\hat{j}\ \text{kN}$$

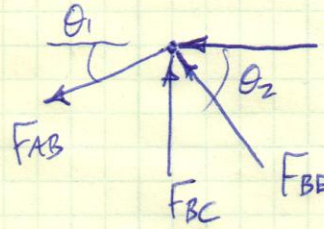
$$\Sigma F_x = 0: \quad \boxed{F_{CE} = 2.21\ \text{kN}\ (C)}$$

$\Sigma F_y = 0: \quad F_{CH} - F_{BC} - 0.6 = 0$

$$\boxed{F_{CH} = F_{BC} + 0.6} \quad \text{EQN. (1)}$$

POINT B:

$$\theta_1 = 15.19^\circ, \quad \theta_2 = \text{TAN}^{-1}\left(\frac{1.2}{1.6}\right) = 36.87^\circ$$



$\vec{F}_{AB} = (-2.29 \cdot \cos 15.19^\circ)\hat{i} + (-2.29 \cdot \sin 15.19^\circ)\hat{j}$

$\vec{F}_{AB} = (-2.21)\hat{i} + (-0.6)\hat{j}$ KN

$\vec{F}_{BE} = (-F_{BE} \cdot \cos 36.87^\circ)\hat{i} + (F_{BE} \cdot \sin 36.87^\circ)\hat{j}$

$\vec{F}_{BE} = (-0.8\,F_{BE})\hat{i} + (0.6\,F_{BE})\hat{j}$ KN

$\Sigma F_x = 0: \quad -2.21 - F_{BD} - 0.8\,F_{BE} = 0$

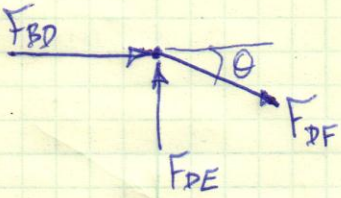
$$\boxed{F_{BD} = -0.8\,F_{BE} - 2.21} \quad \text{EQN. (2)}$$

$\Sigma F_y = 0: \quad F_{BC} - 0.6 + 0.6\,F_{BE} = 0$

$$\boxed{F_{BC} = -0.6\,F_{BE} + 0.6} \quad \text{EQN. (3)}$$

POINT D:

$$\theta = 15.19^\circ$$



$\vec{F}_{DF} = (2.29 \cdot \cos 15.19^\circ)\hat{i} + (2.29 \cdot \sin 15.19^\circ)\hat{j}$

$\vec{F}_{DF} = (2.21)\hat{i} + (-0.6)\hat{j}$ KN

$\Sigma F_x = 0: \quad \boxed{F_{BD} = -2.21 \text{ KN (T)}}$

$\Sigma F_y = 0$: $\boxed{F_{DE} = 0.6\ kN\ (C)}$

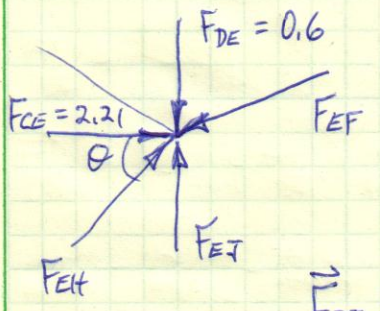
EQN. (2): $-2.21 = -0.8\,F_{BE} - 2.21 \Rightarrow \boxed{F_{BE} = 0}$

EQN. (3): $\boxed{F_{BC} = 0.6\ kN\ (C)}$

EQN. (1): $\boxed{F_{CH} = 0.6 + 0.6 = 1.2\ kN\ (C)}$

POINT E:

$\theta = 36.87°$



$\vec{F}_{EH} = (F_{EH}\cdot\cos 36.87°)\,\hat{i} + (F_{EH}\cdot\sin 36.87°)\,\hat{j}$

$\vec{F}_{EH} = (0.8\,F_{EH})\,\hat{i} + (0.6\,F_{EH})\,\hat{j}\ kN$

$\vec{F}_{EF} = (-2.29\cdot\cos 15.19°)\,\hat{i} + (-2.29\cdot\sin 15.19°)\,\hat{j}$

$\vec{F}_{EF} = (-2.21)\,\hat{i} + (-0.6)\,\hat{j}\ kN$

$\Sigma F_x = 0$: $2.21 + 0.8\,F_{EH} - 2.21 = 0$

$\boxed{F_{EH} = 0}$

$\Sigma F_y = 0$: $-0.6 - 0.6 + F_{EJ} = 0$

$\boxed{F_{EJ} = 1.2\ kN\ (C)}$