Prob. 1 (6.6)

FBD Truss:

\[ \sum M_A = 0: \ (10.2 \text{ m}) C_y + (2.4 \text{ m})(15 \text{ kN}) - (3.2 \text{ m})(49.5 \text{ kN}) = 0 \]

\[ C_y = 12.0 \text{ kN} \uparrow \]

Joint FBDs:

Joint C:

\[ \frac{F_{BC}}{7.4} = \frac{F_{CD}}{7.4} = \frac{12 \text{ kN}}{8} \]

\[ F_{BC} = 18.50 \text{ kN} \uparrow \]

\[ F_{CD} = 18.50 \text{ kN} \downarrow \]

\[ \Sigma F_x = 0: \ - \frac{4}{5} F_{AB} - \frac{7}{7.4} (18.5 \text{ kN}) = 0 \]

\[ F_{AB} = 21.9 \text{ kN} \uparrow \]

Joint B:

\[ \Sigma F_y = 0: \ \frac{3}{5} (21.875 \text{ kN}) - 49.5 \text{ kN} + \frac{2.4}{7.4} (18.5 \text{ kN}) + F_{BD} = 0 \]

\[ F_{BD} = 30.4 \text{ kN} \uparrow \]

Joint D:

\[ \Sigma F_x = 0: \ - \frac{4}{5} F_{AD} + \frac{7}{7.4} (18.5 \text{ kN}) + 15 \text{ kN} = 0 \]

\[ F_{AD} = 40.6 \text{ kN} \uparrow \]
Prob. 2 (6.30)

By inspection of joint $D$,

$$ F_{DI} = 0 $$

By inspection of joint $E$,

$$ F_{EI} = 0 $$

Then, by inspection of joint $I$,

$$ F_{AI} = 0 $$

By inspection of joint $F$,

$$ F_{FK} = 0 $$

By inspection of joint $G$,

$$ F_{GK} = 0 $$

Prob. 3 (6.50)

FBD Truss:

Distance between loads = 1.5 m

$$ \sum F_x = 0: \quad A_x = 0 $$

By symmetry, $A_y = K_y = 18 \text{kN}$

FBD Section ABC:

$$ \sum M_D = 0: \quad (1.5 \text{ m}) F_{CE} + (1.5 \text{ m})(6 \text{kN}) - (3 \text{ m})(18 \text{kN} - 3 \text{kN}) = 0 $$

$$ F_{CE} = 22.5 \text{kN} \quad \text{T} $$

$$ \sum M_A = 0: \quad (1.8 \text{ m}) \frac{4}{5} F_{CD} - (1.5 \text{ m})(6 \text{kN}) = 0 $$

$$ F_{CD} = 6.25 \text{kN} \quad \text{T} $$

$$ \sum F_y = 0: \quad 18 \text{kN} - 3 \text{kN} - 6 \text{kN} - \frac{8}{17} F_{BD} + \frac{4}{5}(6.25 \text{kN}) = 0 $$

$$ F_{BD} = 29.8 \text{kN} \quad \text{C} $$
Prob. 4 (6.60)

FBD Truss:

\[ \sum F_x = 0: \quad A_x = 0 \]

By symmetry, \[ A_y = N_y = 1.6 \text{ kips} \uparrow \]

\[
\begin{align*}
\sum M_D &= 0: \quad (9 \text{ ft}) F_{FH} + (6 \text{ ft})(0.5 \text{ kip}) - (12 \text{ ft})(1.6 \text{ kips}) = 0 \\
F_{FH} &= 1.800 \text{ kips T} \downarrow \\
\sum F_z &= 0: \quad 1.800 \text{ kips} - F_{DG} = 0 \\
F_{DG} &= 1.800 \text{ kips C} \uparrow
\end{align*}
\]