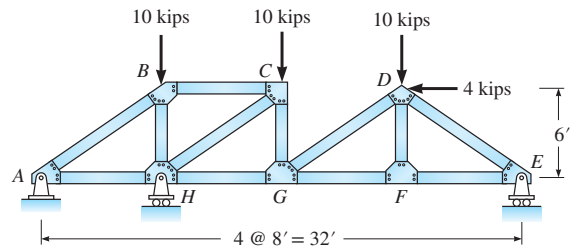
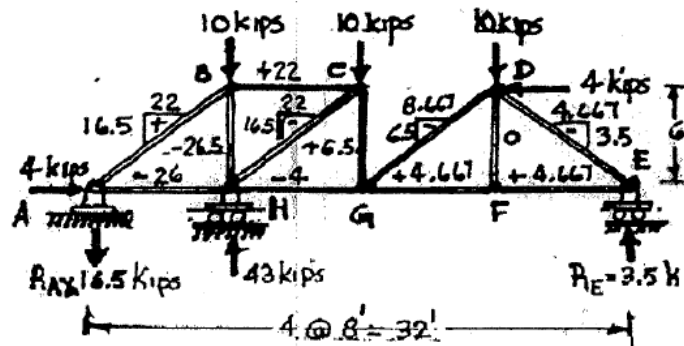


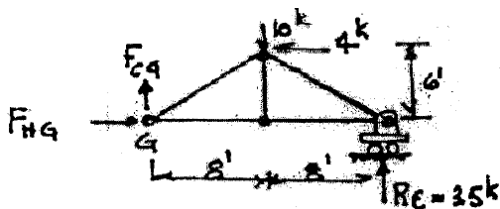
**P4.13.** Determine the forces in all bars of the trusses. Indicate tension or compression.



P4.13



Compute  $R_E$ :  $\Sigma M$  about  $G$



$$\Sigma M_G = 0; 10^k \times 8' - 4^k \times 6' - R_E 16' = 0$$

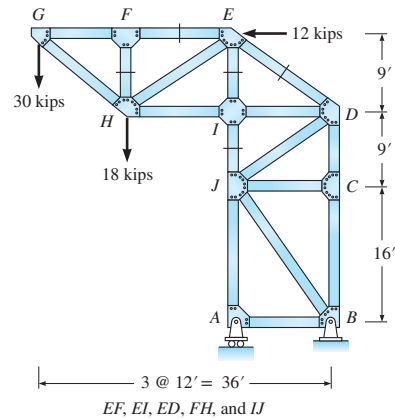
$$R_E = 3.5 \text{ kips } \uparrow$$

$$\Sigma F_x = 0; F_{HG} - 4 = 0$$

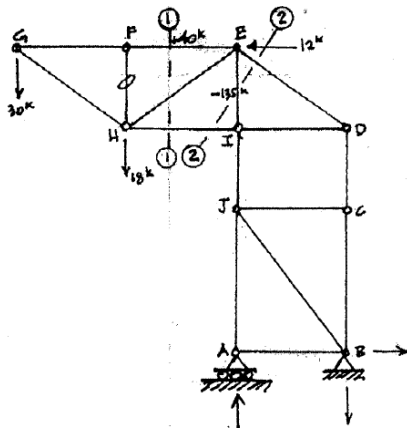
$$\therefore F_{HG} = 4^k \rightarrow$$

Complete by Method of Joints.

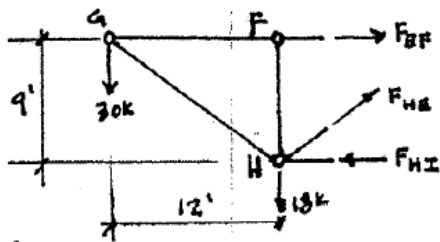
**P4.37.** Using the method of sections, determine the forces in the bars listed below each figure.



**P4.37**



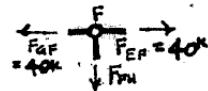
Freebody Left of Section (1) to Compute Force in Bar "EF":



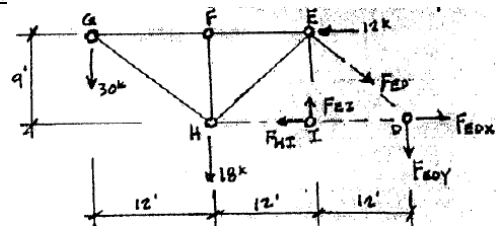
$$\begin{aligned} \sum M_H = 0; \quad & F_{EF}(9') - 30^k(12') = 0 \\ & \boxed{F_{EF} = 40^k \text{ tension}} \end{aligned}$$

Freebody Joint "F":

$$+\uparrow \sum F_y = 0; \quad \boxed{F_{FH} = 0}$$



Freebody Left of Section (2) to Compute Bar Forces in Bars EI&ED:



$$\begin{aligned} \sum M_D = 0; \quad & -30^k(36') - 18^k(24') - 12^k(9') + F_{EI}(12') = 0 \\ & \boxed{F_{EI} = 135^k \text{ compression}} \end{aligned}$$

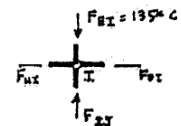
$$\begin{aligned} \sum M_I = 0; \quad & -30^k(24') - 18^k(12') - 12^k(9') + F_{EDY}(12') = 0 \\ & \boxed{F_{EDY} = 87^k \downarrow} \end{aligned}$$

$$\frac{F_{EDX}}{4'} = \frac{87^k}{3'} \quad \boxed{F_{EDX} = 116^k}$$

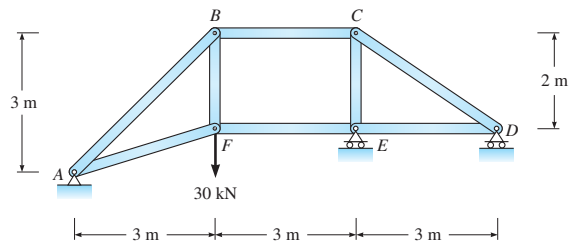
$$\text{Thus} \quad \boxed{F_{ED} = 145^k \text{ tension}}$$

Freebody Joint I:

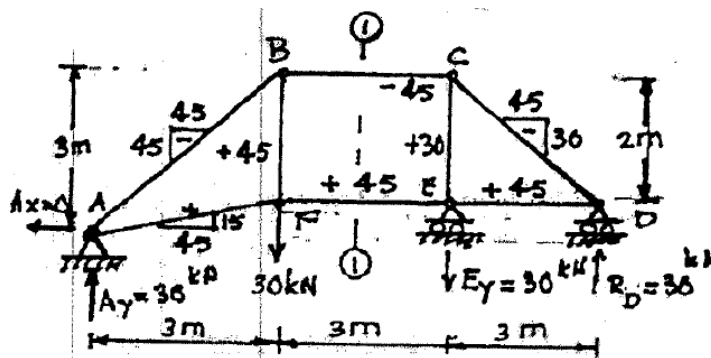
$$\begin{aligned} +\uparrow \sum F_y = 0; \quad & -F_{EI} + F_{IJ} = 0 \\ & \boxed{F_{IJ} = 135^k \text{ compression}} \end{aligned}$$



**P4.40.** Determine the forces in all bars of the truss. Indicate tension or compression.  
*Hint:* Start with the method of sections.



P4.40



$$\Sigma F_x = 0 \therefore A_x = 0$$

Cut Section (2)-(5)

$$\uparrow \Sigma F_y = 0; \quad A_y - 30 = 0$$

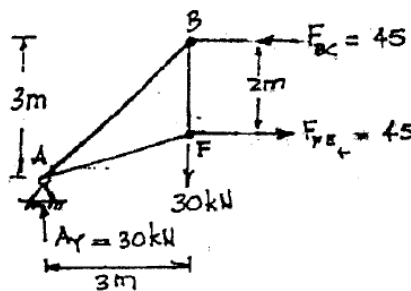
$$A_y = 30 \text{ kN } \uparrow$$

$$\hat{\Sigma} M_f = 0; \quad A_y \cdot 3 - F_{BC} \cdot 2 = 0$$

$$F_{BC} = \frac{3}{2} A_y = 45 \text{ kN}$$

$$\rightarrow \Sigma F_x = 0; \quad -F_{BC} + F_{FE} = 0$$

$$F_{FE} = F_{BC} = 45 \text{ kN}$$



Entire Structure

$$\hat{\Sigma} M_D = 0; \quad 30 \times 9 - 30 \times 6 - E_y \cdot 3 = 0$$

$$E_y = 30 \text{ kN } \downarrow$$

$$\uparrow \Sigma F_y = 0; \quad 30 - 30 - 30 + R_D = 0$$

$$R_D = 30 \text{ kN } \uparrow$$

Final Results Shown Above