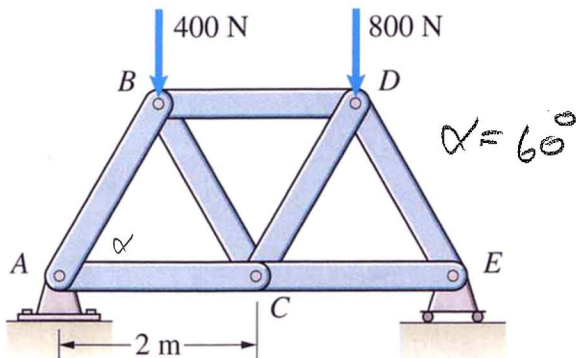
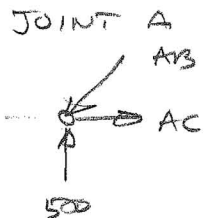


For the truss and loading shown, determine the force in each member. All members are identical length. State whether each member is in tension or compression.

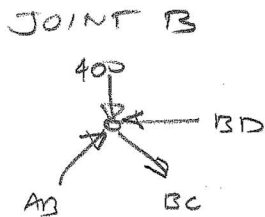


$$\begin{aligned} \sum M_A &= 0 \\ 400(1) + 800(3) &= E(4) \\ E &= 700 \text{ N} \\ \sum F_y &= 0 \\ A_y + E &= 400 + 800 \\ A_y &= 500 \text{ N} \\ \sum F_x &= 0 \quad A_x = 0 \end{aligned}$$



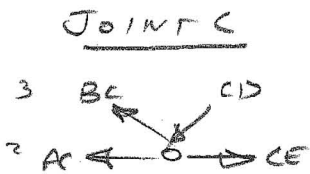
$$\begin{aligned} \sum F_y &= 0 \\ AB \sin 60 &= 500 \\ AB &= 577.4 \text{ N} \\ &\text{(Comp)} \end{aligned}$$

$$\begin{aligned} \sum F_x &= 0 \\ AC &= AB \cos 60 \\ &= 288.7 \text{ N} \\ &\text{(TENS)} \end{aligned}$$



$$\begin{aligned} \sum F_y &= 0 \\ AD \sin 60 - 400 - BC \sin 60 &= 0 \\ 500 - 400 &= BC \sin 60 \\ BC &= 115.5 \text{ N (T)} \end{aligned}$$

$$\begin{aligned} \sum F_x &= 0 \\ BD &= AB_x + BC_x \\ &= AB \cos 60 + BC \cos 60 \\ &= 346.4 \text{ N (C)} \end{aligned}$$



$$\begin{aligned} \sum F_y &= 0 \\ CD_y &= BC_y \\ CD &= BC \\ CD &= 115.5 \text{ N (C)} \end{aligned}$$

$$\begin{aligned} \sum F_x &= 0 \\ CE &= AC + 2BC_x \\ &= 288.7 + 115.5(\cos 60) \cdot 2 \\ &= 404.1 \text{ N (T)} \end{aligned}$$

JOINT D



ΣF_x

$$BD + CD_x - DE_x = 0$$

$$CD(1.5) - DE(1.5) = -BD$$

$$CD - DE = -2BD$$

ΣF_y

$$800 = CD_y + DE_y$$

$$CD + DE = \frac{800}{\sin 60}$$

$$CD + DE = 923.7 \leftarrow$$

$$CD - DE = -642.8 \rightarrow$$

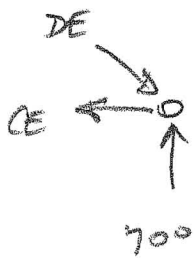
$$\underline{2CD = 230.9}$$

$$\boxed{CD = 115.47} \quad (C)$$

$$DE = CD + 2BD$$

$$\boxed{DE = 808.29 \text{ N}} \quad (C)$$

JOINT E



$$DE \sin 60 = 700$$

$$\boxed{DE = 808.3 \text{ N}} \quad \checkmark$$

$$CE = DE \cos 60$$

$$\boxed{CE = 404.1 \text{ N}}$$