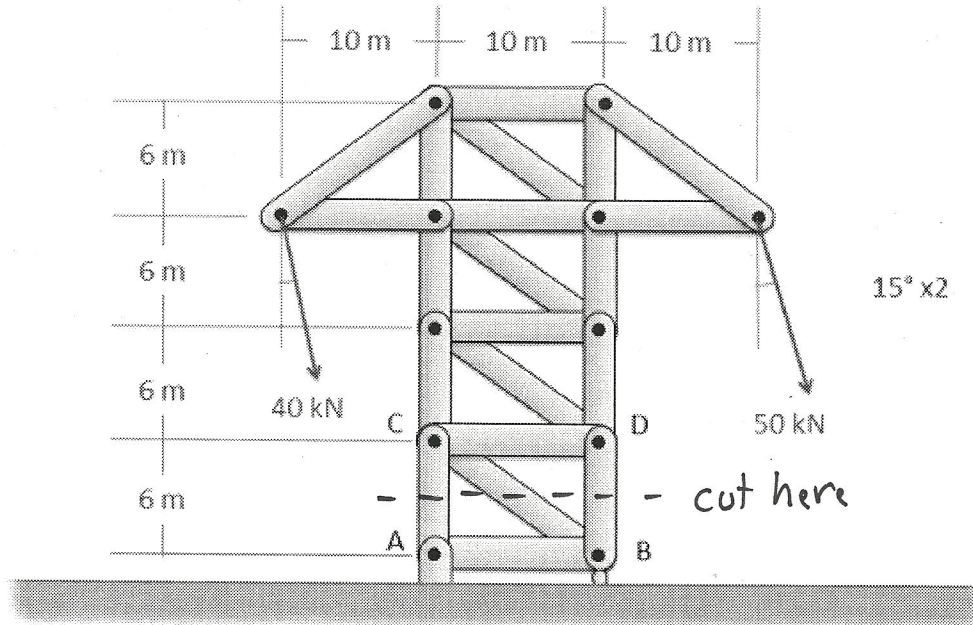


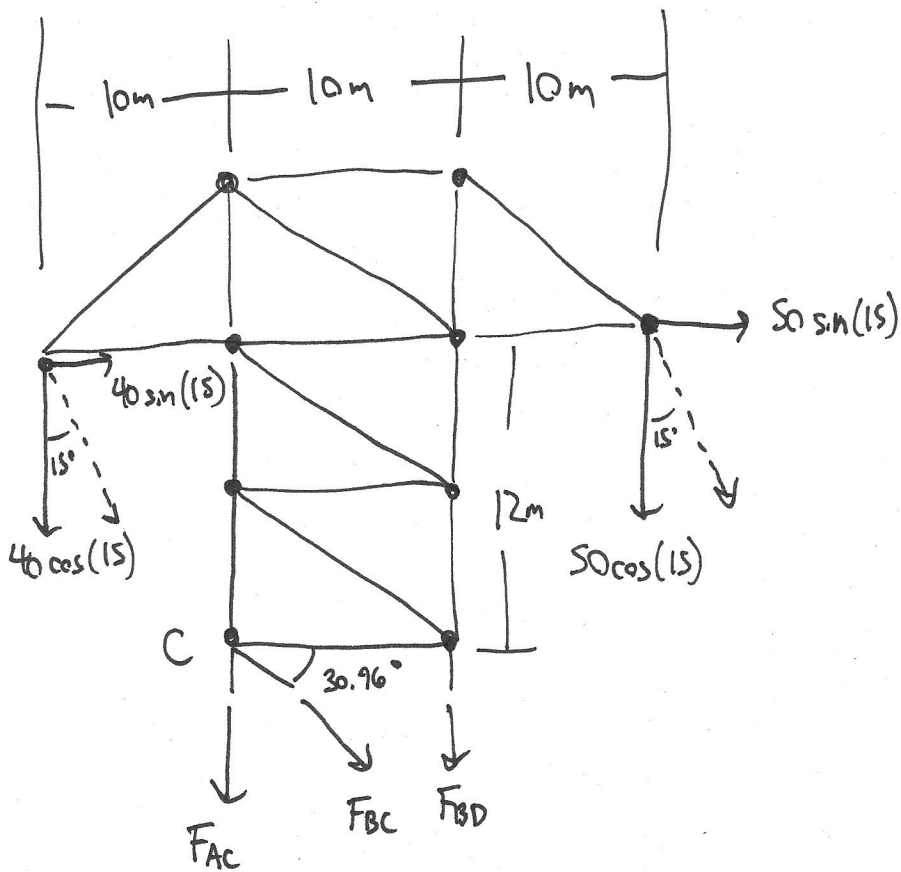
Question 2:

Find the forces acting on members AC, BC, and BD of the truss. Be sure to indicate if the forces are tensile or compressive.



Calculations:

Since the top section has no reaction forces acting on it, we do not need to calculate the reaction forces if we analyze the top section.



$$\theta = \tan^{-1}\left(\frac{6}{10}\right)$$

$$\sum F_x = 40 \sin(15) + 50 \sin(15) + F_{BC} \cos(30.96) = 0$$

$$\sum F_y = -40 \cos(15) - 50 \cos(15) - F_{AC} - F_{BC} \sin(30.96) - F_{BD} = 0$$

$$\sum M_c = (40 \cos(15))(10) - (40 \sin(15))(12) - (50 \cos(15))(20) - (50 \sin(15))(12) - (F_{BD})(10) = 0$$

$$F_{BC} = \frac{-40 \sin(15) - 50 \sin(15)}{\cos(30.96)} = \boxed{-27.16 \text{ kN}}$$

$$F_{BD} = \frac{40 \cos(15)(10) - 40 \sin(15)(12) - 50 \cos(15)(20) - 50 \sin(15)(12)}{10}$$

$$\boxed{F_{BD} = -85.91 \text{ kN}}$$

$$F_{AC} = -40 \cos(15) - 50 \cos(15) - \sin(30.46)(-27.16) - (-85.91)$$

$$F_{AC} = 12.95 \text{ kN}$$

Solution:

$$F_{AC} = 12.95 \text{ kN T}$$

$$F_{BC} = 27.16 \text{ kN C}$$

$$F_{BD} = 85.91 \text{ kN C}$$