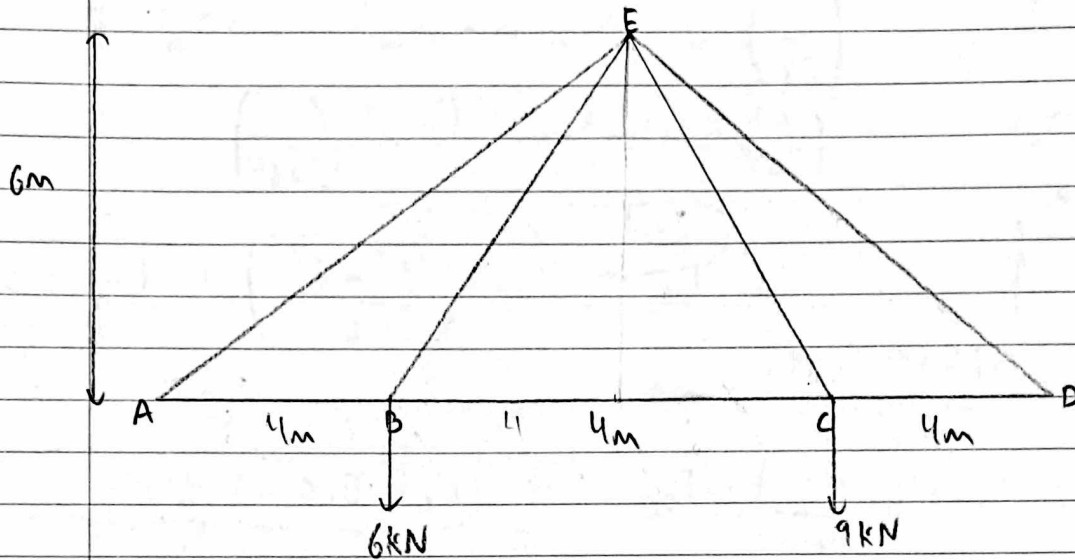


Solutions: 21-5-6.3-Mk-01



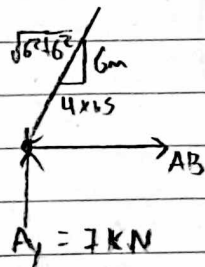
$$\sum M_A = N_D(12m) - 6kN(4m) - 9kN(8m) = 0$$

$$N_D = \frac{6kN(4m) + 9kN(8m)}{12m} \rightarrow N_D = 8.00kN$$

$$\sum F_y = 0 = 8kN - 6kN - 9kN + A_y \rightarrow A_y = 7kN$$

$$A_x = 0 \quad D_x = 0$$

Point A



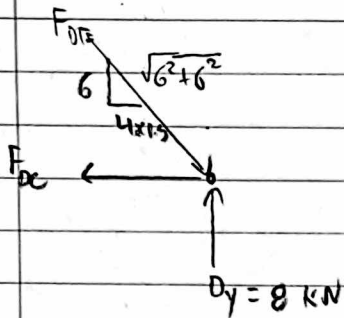
$$\sum F_y = 0 = 7kN - \frac{6}{\sqrt{6^2 + 4^2}} (F_{AE})$$

$$F_{AE} = 7kN \frac{\sqrt{6^2 + 4^2}}{6} = 9.90kN \text{ Tension}$$

$$F_{AE} = 9.90kN \text{ Compression}$$

$$\sum F_x = 0 = F_{AB} - (9.90kN) \left(\frac{4m \times 1.5}{\sqrt{6^2 + 4^2}} \right) \rightarrow F_{AB} = 7.00kN \text{ tension}$$

Joint D

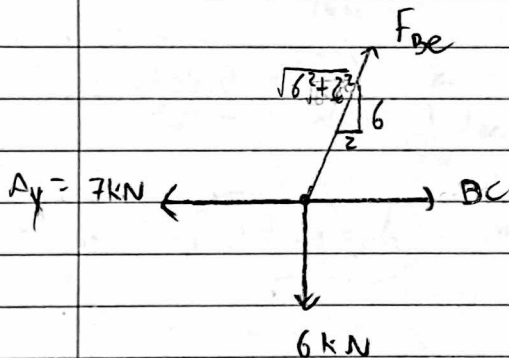


$$\sum F_y = 0 = 8 \text{ kN} - F_{DE} \left(\frac{6}{\sqrt{6^2 + 4^2}} \right)$$

$$F_{DE} = 8 \text{ kN} \left(\frac{\sqrt{6^2 + 4^2}}{6} \right) \Rightarrow F_{DE} = 11.3 \text{ kN (comp)}$$

$$\sum F_x = 0 = 11.3 \text{ kN} \left(\frac{6}{\sqrt{6^2 + 4^2}} \right) - F_{DC} \Rightarrow F_{DC} = 8.0 \text{ kN tension}$$

Joint B



$$\sum F_y = 0 = F_{BE} \left(\frac{2}{\sqrt{6^2 + 2^2}} \right) - 6 \text{ kN}$$

$$F_{BE} = 6 \text{ kN} \frac{\sqrt{6^2 + 2^2}}{2} = 6.3$$

$$F_{BE} = 6.32 \text{ kN tension}$$

$$\sum F_x = 0 = F_{BC} - 7 \text{ kN} + 6.32 \text{ kN} \left(\frac{6}{\sqrt{6^2 + 2^2}} \right)$$

$$F_{BC} = 7 \text{ kN} - 6.32 \text{ kN} \left(\frac{6}{\sqrt{6^2 + 2^2}} \right)$$

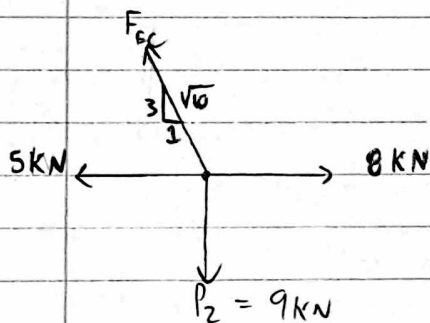
$$F_{BC} = 5.00 \text{ kN tension}$$

$$\sum F_x = 0 \quad F_{BC} - 7.00 + 6.32 \text{ kN} \left(\frac{1}{\sqrt{10}} \right)$$

$$F_{BC} = 7.00 - 6.32 \text{ kN} \left(\frac{1}{\sqrt{10}} \right)$$

$$F_{BC} = 5 \text{ kN} \quad \text{tension}$$

Joint C



$$\sum F_y = 9 \text{ kN} - \frac{3}{\sqrt{10}} F_{BC} \Rightarrow F_{BC} = \frac{9 \text{ kN} \sqrt{10}}{3} \Rightarrow F_{BC} = 9.486 \text{ N} \quad \text{T}$$