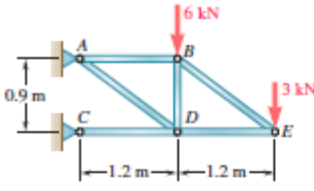


NGN1105D Engineering Mechanics – QUIZ # 6i
Wednesday, November 6, 2019



PROBLEM 6.164

Using the method of joints, determine the force in each member of the truss shown. State whether each member is in tension or compression.

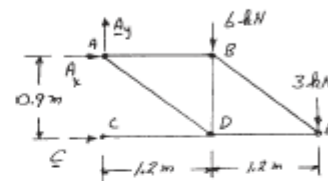
SOLUTION

Reactions:

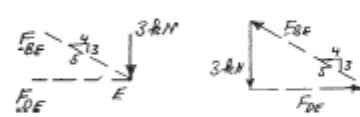
$$\Sigma M_C = 0: A_x = 16 \text{ kN} \leftarrow$$

$$\Sigma F_y = 0: A_y = 9 \text{ kN} \uparrow$$

$$\Sigma F_x = 0: C = 16 \text{ kN} \rightarrow$$



Joint E:

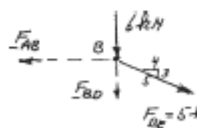


$$\frac{F_{BE}}{5} = \frac{F_{DE}}{4} = \frac{3 \text{ kN}}{3}$$

$$F_{BE} = 5.00 \text{ kN} \quad T \blacktriangleleft$$

$$F_{DE} = 4.00 \text{ kN} \quad C \blacktriangleleft$$

Joint B:




$$\rightarrow \Sigma F_x = 0: \frac{4}{5}(5 \text{ kN}) - F_{AB} = 0$$

$$F_{AB} = +4 \text{ kN} \quad F_{AB} = 4.00 \text{ kN} \quad T \blacktriangleleft$$

$$+\uparrow \Sigma F_y = 0: -6 \text{ kN} - \frac{3}{5}(5 \text{ kN}) - F_{BD} = 0$$

$$F_{BD} = -9 \text{ kN} \quad F_{BD} = 9.00 \text{ kN} \quad C \blacktriangleleft$$

Joint D:



$$+\uparrow \Sigma F_y = 0: -9 \text{ kN} + \frac{3}{5}F_{AD} = 0$$

$$F_{AD} = +15 \text{ kN} \quad F_{AD} = 15.00 \text{ kN} \quad T \blacktriangleleft$$

$$\rightarrow \Sigma F_x = 0: -4 \text{ kN} - \frac{4}{5}(15 \text{ kN}) - F_{CD} = 0$$

$$F_{CD} = -16 \text{ kN} \quad F_{CD} = 16.00 \text{ kN} \quad C \blacktriangleleft$$