Engineering Mechanics – Statics Worksheets

Problem 2 -Trusses I

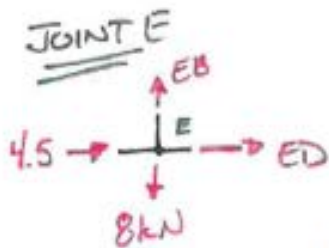Determine the force in each member of the truss.
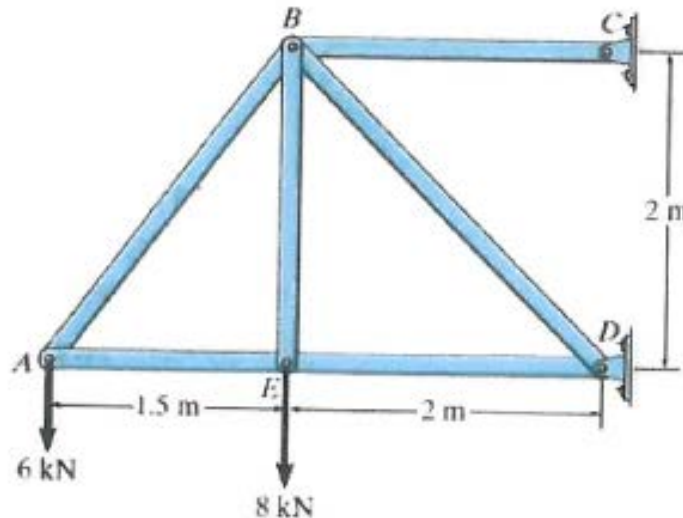
USE METHOD OF JOINTS SINCE YOU NEED FORCES IN
EACH MEMBER
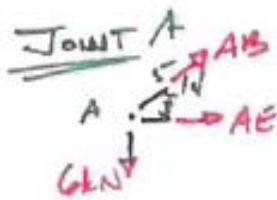
JOINT A

$+\uparrow \Sigma F_y = 0$ $\frac{4}{5}AB - 6 = 0$ $AB = 7.5 \text{ kN (T)}$

$+\rightarrow \Sigma F_x = 0$ $\frac{3}{5}\overset{7.5}{AB} + AE = 0$ $AE = -4.5 \text{ kN}$

$\therefore AE = 4.5 \text{ kN (C)}$

JOINT E

$+\uparrow \Sigma F_y = 0$ $EB - 8 = 0$ $EB = 8 \text{ kN (T)}$

$\rightarrow \Sigma F_x = 0$ $ED + 4.5 = 0$ $ED = 4.5 \text{ kN (C)}$

NOTE: YOU COULD SOLVE "BY INSPECTION" - NO NEED FOR
EQNS OF EQUILIBRIUM

JOINT B
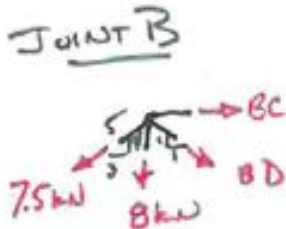
$+\uparrow \Sigma F_y = 0$ $-\frac{4}{5}(7.5) - 8 - \frac{1}{\sqrt{2}}BD = 0$ $BD = -19.8 \text{ kN}$

$\therefore BD = 19.8 \text{ kN (C)}$

(-19.8)

$+\rightarrow \Sigma F_x = 0$ $BC + \frac{1}{\sqrt{2}}\overset{(-19.8)}{BD} - 7.5(\frac{3}{5}) = 0$ $BC = 13.5 \text{ kN (T)}$