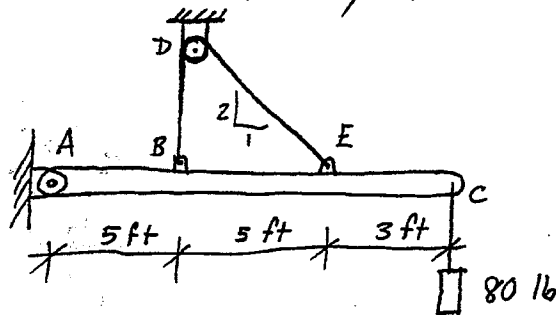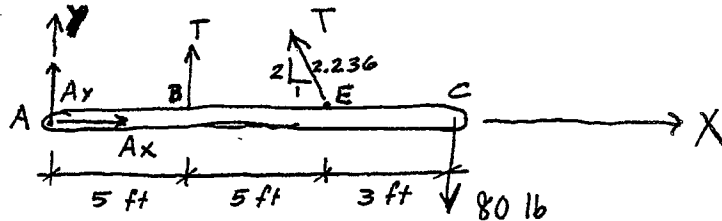5-28 Determine the tension in the cable and
the horizontal and vertical components of
reaction of the pin A. The pulley at D
is frictionless and the cylinder weighs 80 lb.

Solution:

- Draw FBD of beam AC

- Use Equilibrium Eq's

$$\xrightarrow{+} \Sigma F_X = 0; \implies A_x - T\left(\frac{1}{2.236}\right) = 0$$

$$\implies +\uparrow \Sigma F_y = 0; \implies A_y + T + T\left(\frac{2}{2.236}\right) - 80 = 0$$

$$\overset{+}{\circlearrowleft} \Sigma M_A = 0; \quad 5T + 10T\left(\frac{2}{2.236}\right) - 80(13) = 0$$

$$\implies T(13.94) - 1040 = 0$$

$$\implies T = 74.61 \text{ lb} \implies \boxed{T = 74.6 \text{ lb}}$$

- Determine A_x, A_y Knowing T

$$A_x = \frac{74.61}{2.236} = 33.37 \text{ lb} \implies \boxed{A_x = 33.4 \text{ lb}}$$

$$A_y = 80 - 74.6 - 74.6\left(\frac{2}{2.236}\right) = -61.33 \text{ lb}$$

$$\implies \boxed{A_y = 61.3 \text{ lb} \downarrow}$$