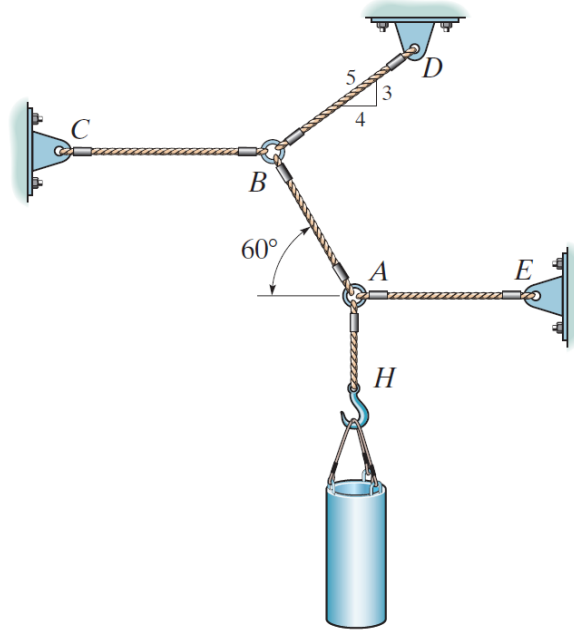


Problem 3-26

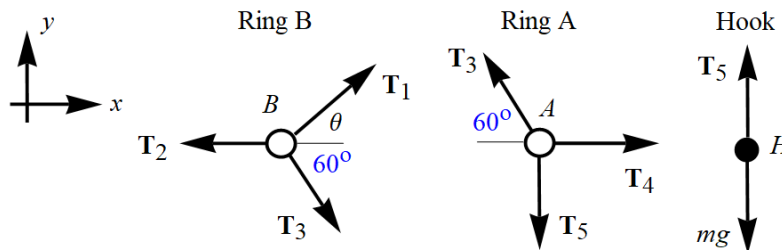
The 30-kg pipe is supported at A by a system of five cords. Determine the force in each cord for equilibrium.



Probs. 3-26/27

Solution

Draw free-body diagrams for each of the rings and the hook.



In order for the system to be in equilibrium, the sum of the forces in each direction must be zero.

$$\sum F_x = 0 : \quad T_1 \cos \theta - T_2 + T_3 \cos 60^\circ = 0 \quad T_4 - T_3 \cos 60^\circ = 0 \quad 0 = 0$$

$$\sum F_y = 0 : \quad T_1 \sin \theta - T_3 \sin 60^\circ = 0 \quad T_3 \sin 60^\circ - T_5 = 0 \quad T_5 - mg = 0$$

Solve this system of five equations for T_1 , T_2 , T_3 , T_4 , and T_5 , noting that $\cos \theta = 4/5$, $\sin \theta = 3/5$, $m = 30 \text{ kg}$, and $g = 9.81 \text{ m/s}^2$.

$$T_1 \approx 491 \text{ N} \quad T_2 \approx 562 \text{ N} \quad T_3 \approx 340. \text{ N} \quad T_4 \approx 170. \text{ N} \quad T_5 \approx 294 \text{ N}$$