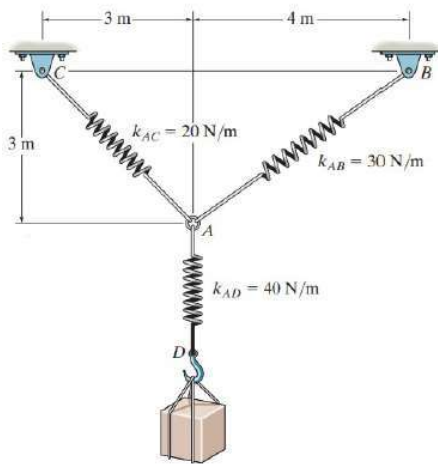


Problem solutions of springs in Statics and Mechanics using equations of Equilibrium

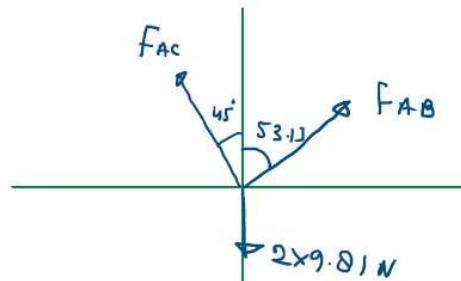
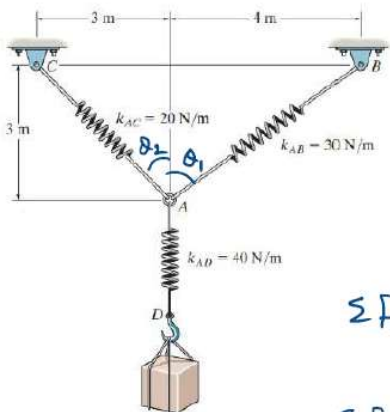
Determine the stretch in each spring for equilibrium of the 2-kg block. The springs are shown in the equilibrium position.



Solution:

Determine the stretch in each spring for equilibrium of the 2-kg block. The springs are shown in the equilibrium position.

$$\theta_1 = \tan^{-1}\left(\frac{4}{3}\right) = 53.13^\circ \quad \theta_2 = \tan^{-1}\left(\frac{3}{3}\right) = 45^\circ$$



$$\sum F_x = 0 :$$

$$F_{AB} \sin 53.13 - F_{AC} \sin 45^\circ = 0 \quad \text{--- ①}$$

$$\sum F_y = 0 :$$

$$F_{AB} \cos 53.13 + F_{AC} \cos 45^\circ = 2 \times 9.81 \quad \text{--- ②}$$

$$\Rightarrow F_{AB} = 14.01 \text{ N}$$

$$F_{AC} = 15.86 \text{ N}$$

$$x_{AB} = \frac{F_{AB}}{k_{AB} \rightarrow 30 \text{ N/m}}$$

$$x_{AC} = \frac{F_{AC}}{k_{AC} \rightarrow 20 \text{ N/m}}$$

$$= 0.467 \text{ m}$$


$$= 0.793 \text{ m}$$

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