

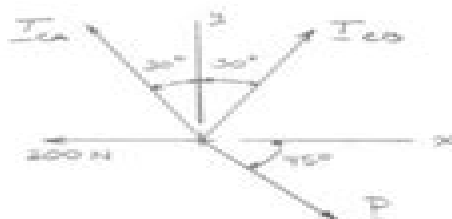


PROBLEM 2.49

Two cables are tied together at C and are loaded as shown. Knowing that $P = 300 \text{ N}$, determine the tension in cables AC and BC .

SOLUTION

Free-Body Diagram



$$+\rightarrow \Sigma F_x = 0 \quad -T_{CA} \sin 30^\circ + T_{CB} \sin 30^\circ - P \cos 45^\circ - 200 \text{ N} = 0$$

For $P = 200 \text{ N}$ we have,

$$-0.5T_{CA} + 0.5T_{CB} + 212.13 - 200 = 0 \quad (1)$$

$$+\uparrow \Sigma F_y = 0 \quad T_{CA} \cos 30^\circ - T_{CB} \cos 30^\circ - P \sin 45^\circ = 0$$

$$0.86603T_{CA} + 0.86603T_{CB} - 212.13 = 0 \quad (2)$$

Solving equations (1) and (2) simultaneously gives,

$$T_{CA} = 134.6 \text{ N} \quad \blacktriangleleft$$

$$T_{CB} = 110.4 \text{ N} \quad \blacktriangleleft$$

Vector Mechanics For Engineers Answers

Judd E. Hollander



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