

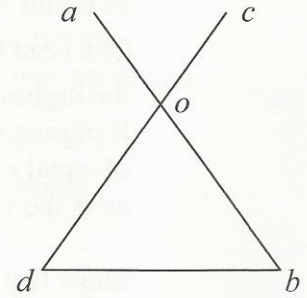
700 7 7.

- (a) aob and cod are two uniform rods, each of weight W , freely hinged at o .

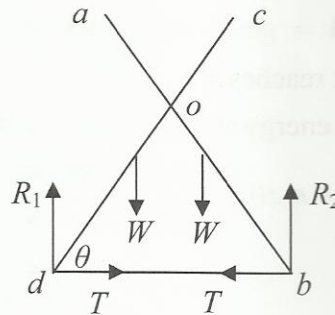
$$|ao| = |co| = 2\ell \text{ and } |ob| = |od| = 5\ell.$$

The rods are in equilibrium in a vertical plane.

The ends b and d rest on a smooth horizontal plane and are connected by a light inextensible string of length 5ℓ .



Find the tension in the string.



$$R_1 + R_2 = 2W$$

$$\theta = 60^\circ$$

Take moments about d for system :

$$W\left(\frac{7\ell}{2}\right)\cos 60 + W\left(5\ell + \frac{3\ell}{2}\right)\cos 60 = R_2(5\ell)$$

$$R_2 = W \text{ and } R_1 = W$$

Take moments about o for od :

$$W\left(\frac{3\ell}{2}\cos 60\right) + T(5\ell \sin 60) = R_1(5\ell \cos 60)$$

$$W\left(\frac{3\ell}{4}\right) + T\left(\frac{5\ell\sqrt{3}}{2}\right) = W\left(\frac{5\ell}{2}\right)$$

$$T = \frac{7W}{10\sqrt{3}} \text{ or } 0.40W$$

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5

5

5

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