

Mastering Physics Solutions Chapter 6

Applications Of Newton's Laws

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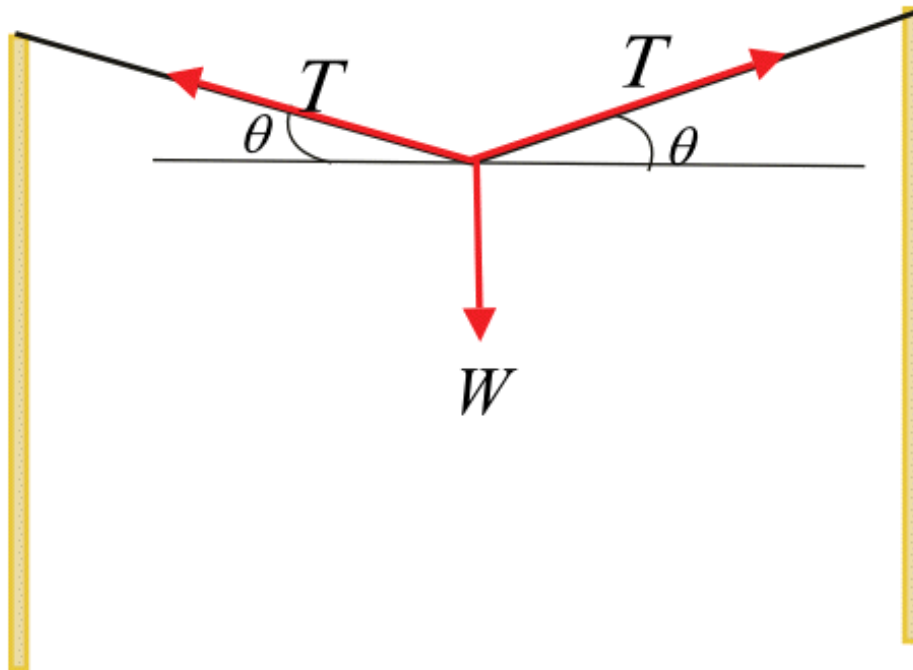
Chapter 6 Applications Of Newton's Laws Q.1CQ

A clothesline always sags a little, even if nothing hangs from it. Explain.

Solution:

The clothesline which we use in our daily life to dry clothes, always sag a little, even when there is no weight on it. The reason is, the clothes line will possess certain mass and so. it will be acted upon by the gravitational force in the downward direction. Also, there exists a tension in the clothes line with its upward component, opposing the gravitational force. As a result, the clothes line will sag a little, as if there were weight on it.

The following is the figure of a clothesline with forces T and its weight W



In the above figure, θ is the angle made by the sag relative to the horizontal. Even though we pull the clothesline hard, in order to make it straight, we still observe that the line will sag a little. In the process of pulling it hard, there will be a rapid increase in the tension of the wire. So, a huge amount of force is required to make the angle θ zero.