Answer on Question #57894-Physics- Mechanics

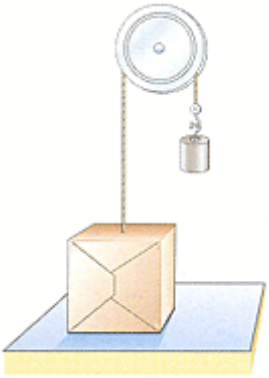
A box weighing 66 N rests on a table. A rope tied to the box runs vertically upward over a pulley and a weight is hung from the other end. Determine the force that the table exerts on the box if the weight hanging on the other side of the pulley weighs each of the following.

(a) 21 N

(b) 58 N

(c) 93 N

Solution



When the box rests on a table the sum of all forces applied to it is zero.

$$W_1 - W_2 - N = 0$$

(a)

$$N = W_1 - W_2 = 66 - 21 = 45\ N$$

(b)

$$N = W_1 - W_2 = 66 - 58 = 8\ N$$

(c) In this case $W_1 < W_2$ and the box will move up with constant acceleration. Thus, the force that the table exerts on the box is zero.

$$N = 0\ N$$