

Q- A 40.0 kg crate is suspended between the floor and the ceiling using two spring scales, one attached to the ceiling and one to the floor. If the lower scale reads 117N, what is the reading of the upper scale? Ignore the Weight of the scales.

The weight of the crate will be

$$W = mg = 40.0 \times 9.8 = 392 \text{ N.}$$

This force is in vertically downward direction and hence can be balanced by an equal force in upward direction.

If the reading of both springs is  $R_1$  and  $R_2$  then

The net force of the springs in upward direction will be  $R_1 - R_2$  as the stretched lower spring will have a pull in downward direction. Hence balancing the forces we get

$$R_1 - R_2 = W$$

Or  $R_1 - 117 = 392$

Or  $R_1 = 117 + 392 = 509 \text{ N}$

