

20080213-1215

Forces

Find the tension in a rope that is supporting a 100.0 kilogram object, on Earth.

Solution:

Here the rope only has to have enough tension to hold the object. There is no acceleration. The tension in the rope must equal the force of gravity on the object.

$$\begin{aligned} \text{Tension} &= (\text{mass})(\text{acc.}) \\ &= (100.0 \text{ kg})(9.8 \text{ m/s}^2) \\ &= 980 \frac{\text{kg m}}{\text{s}^2} \end{aligned}$$

$$\text{Tension} = 980 \text{ newtons}$$

Note:

See 20080213-1234 for the case where the rope must accelerate the object upward.