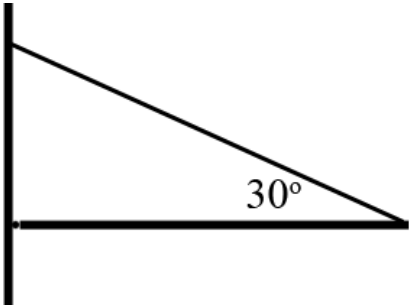


Question #81311, Physics / Mechanics | Relativity

A horizontal rod with a mass of 10 kg and length 12m is hinged to a wall at one end and supported by a cable which makes an angle of 30° with the rod at its other end. Calculate the tension in the cable and the force exerted by the hinge

Solution



The net moment around the hinge is zero.

$$\sum M = 0$$
$$-10 \frac{12}{2} g + T \sin 30 (12) = 0$$

The tension in the cable:

$$T = 12g = 118 \text{ N.}$$
$$\sum F_x = 0 \rightarrow R_x = T \cos 60$$
$$R_x = 118 \cos 60 = 58.86 \text{ N.}$$
$$\sum F_y = 0 \rightarrow R_y + T \sin 30 = mg$$
$$R_y = 12(9.8) - 118 \sin 30 = 58.86 \text{ N}$$

The force exerted by the hinge:

$$R = \sqrt{58.86^2 + 58.86^2} = 83 \text{ N.}$$

Answer provided by <https://www.AssignmentExpert.com>