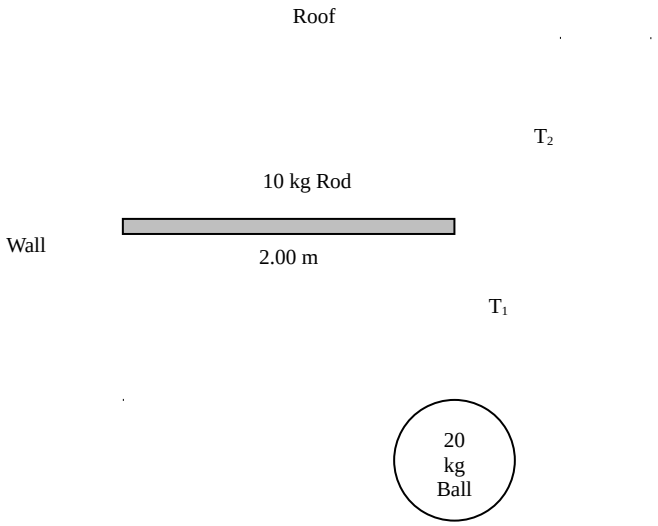
Name _____ 3AB – Physics Date ___/___/_____

Revision of Torque Concepts – 2011



a) Find the tension in cable T_1.

b) Find the tension in cable T_2.

c) Find the force of the rod on the Wall (note this is the opposite of the force on the rod)

d) If the rod was massless what was the force of the rod on the cables attached to the end of the rod?

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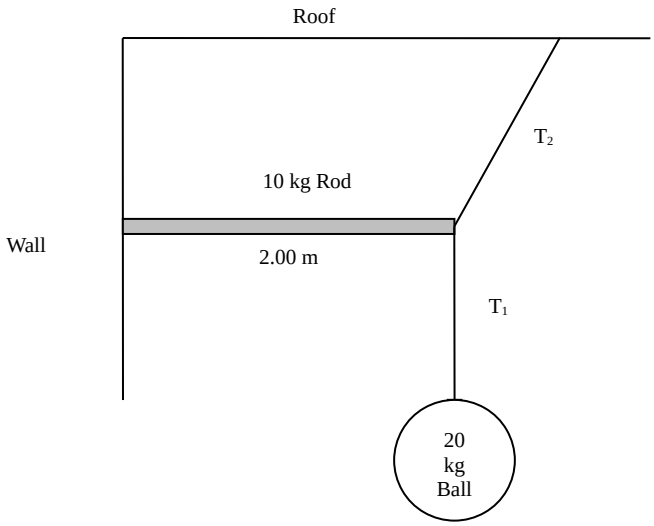


a) Find the tension in cable T_1.

Wt = mg
Wt = 20 x 9.8
Wt = 196 N

b) Find the tension in cable T_2.

$M_c = M_a$

(20 x 9.8 x 2) + (10 x 9.8 x 1) = (2 x T_2 Cos 20^0)
(392) + (98) = (1.88 x T_2)
T_2 = 260.6 N

c) Find the force of the rod on the Wall (note this is the opposite of the force on the rod)

$F_{up} = F_{down}$
$W_{up} + 260.6 \text{ Cos } 20^0 = (10 \times 9.8) + (20 \times 9.8)$
$W_{up} + 244.9 = (98) + (196)$
$W_{up} + 244.9 = (294)$
$W_{up} = 49.1$ N Up

$F_{left} = F_{right}$
$W_{right} = 260.6 \text{ Sin } 20$
$W_{left} = 89.1$ N to the left

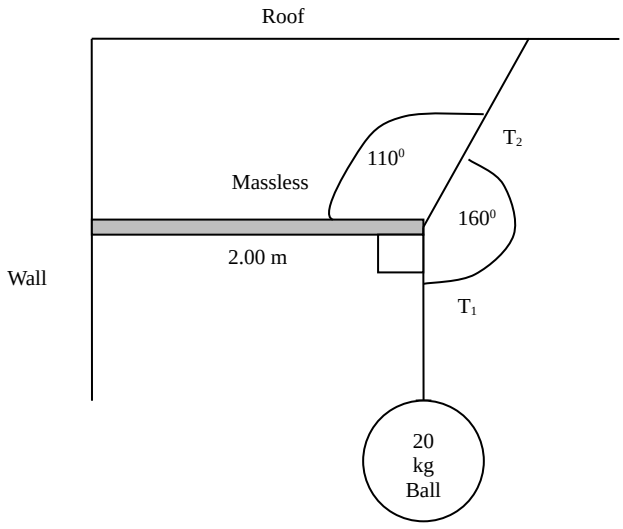
$W = 89.1^2 + 49.1^2$

$W = 101.8$ N

$\text{Tan } \theta = 49.1 / 89.1$
$\theta = 28.8^0$
Ans for force on rod = 101.8 N Left 28.8^0 up

Ans for force on wall = 101.8N Right 28.8^0 down.

d) If the rod was massless what was the force of the rod on the cables attached to the end of the rod?



Use sin rule

$\frac{\text{Rod}}{\text{Sin } 160^0} = \frac{20 \times 9.8}{\text{Sin } 110^0}$

Rod = 71.3 N towards the wall.
By the way $T_2 = 208.6$ N along the cable.