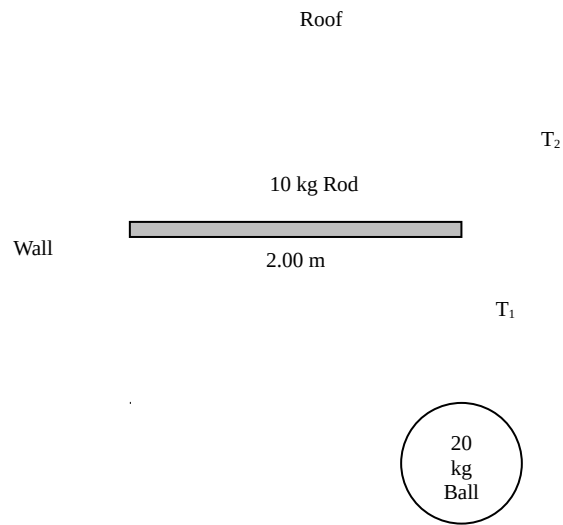


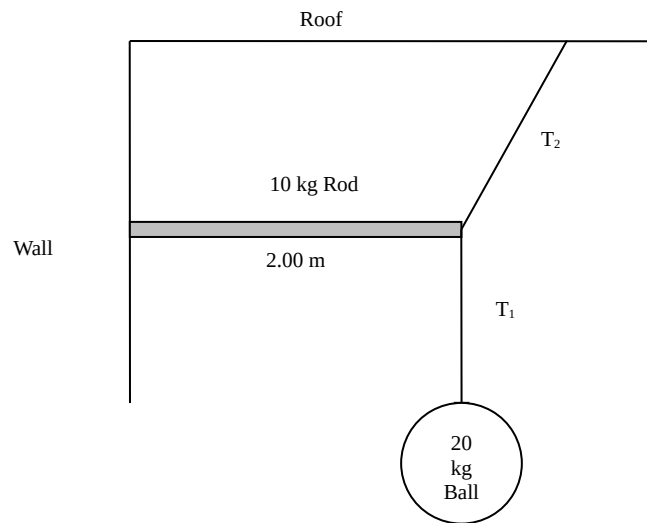
**Revision of Torque Concepts – 2011**

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?

**Revision of Torque Concepts – 2011**

- a) Find the tension in cable  $T_1$ .

$$W_t = mg$$

$$W_t = 20 \times 9.8$$

$$\mathbf{W_t = 196\ N}$$

- b) Find the tension in cable  $T_2$ .

$$M_c = M_a$$

$$(20 \times 9.8 \times 2) + (10 \times 9.8 \times 1) = (2 \times T_2 \cos 20^\circ)$$

$$(392) + (98) = (1.88 \times T_2)$$

$$\mathbf{T_2 = 260.6\ N}$$

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

$$F_{\text{up}} = F_{\text{down}}$$

$$W_{\text{up}} + 260.6 \cos 20^\circ = (10 \times 9.8) + (20 \times 9.8)$$

$$W_{\text{up}} + 244.9 = (98) + (196)$$

$$W_{\text{up}} + 244.9 = (294)$$

$$W_{\text{up}} = 49.1 \text{ N Up}$$

$$F_{\text{left}} = F_{\text{right}}$$

$$W_{\text{right}} = 260.6 \sin 20^\circ$$

$$W_{\text{left}} = 89.1 \text{ N to the left}$$

$$W = 89.1^2 + 49.1^2$$

$$W = 101.8 \text{ N}$$

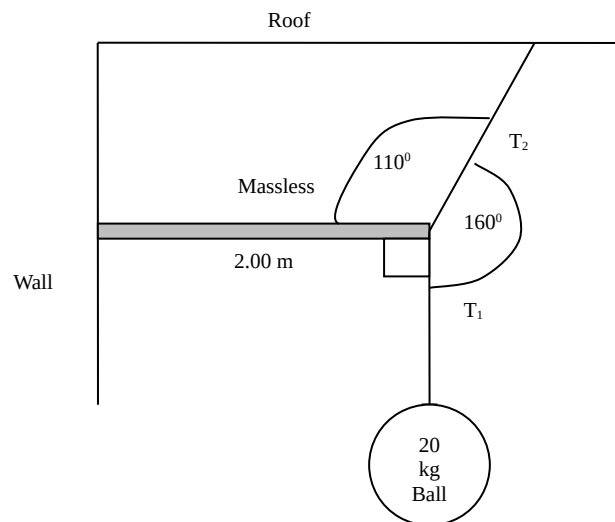
$$\tan \theta = 49.1 / 89.1$$

$$\theta = 28.8^\circ$$

$$\text{Ans for force on rod} = 101.8 \text{ N Left } 28.8^\circ \text{ up}$$

**Ans for force on wall = 101.8N Right 28.8° 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

$$\frac{\text{Rod}}{\sin 160^\circ} = \frac{20 \times 9.8}{\sin 110^\circ}$$

**Rod = 71.3 N towards the wall.**

By the way  $T_2 = 208.6 \text{ N}$  along the cable.