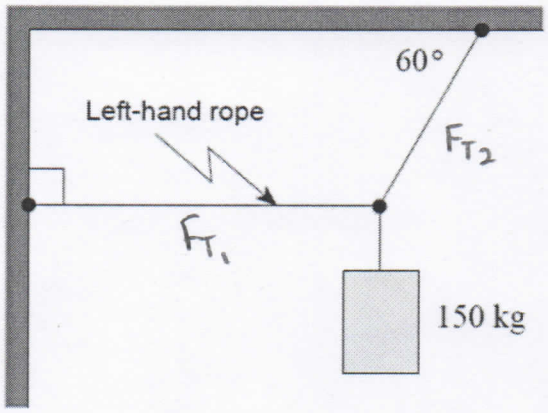
Physics 12 Review #30

1.

A 150 kg object is suspended from a ceiling and attached to a wall. What is the tension in the left-hand rope?



A. 7.4×10^2 N

B. 8.5×10^2 N

C. 1.3×10^3 N

D. 2.5×10^3 N

$$F_{T_1} = \frac{150\times9.8}{\tan 60^\circ}$$

$$= 850\ N$$

$$\uparrow \Sigma F_y = 0$$

$$F_{T_1} - F_{T_2}\cos 60^\circ = 0$$

$$F_{T_1} = F_{T_2}\cos 60^\circ$$

$$\uparrow \Sigma F_y = 0$$

$$F_{T_2}\sin 60 - mg = 0$$

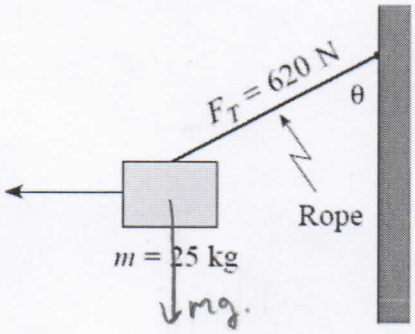
$$F_{T_2}\sin 60 = mg$$

$$F_{T_2} = \frac{mg}{\sin 60}$$

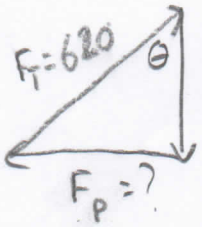
$$\therefore F_{T_1} = \frac{mg\cos 60}{\sin 60} = \frac{mg}{\tan 60^\circ}$$

2.

A 25 kg block is pulled by a horizontal force. The supporting rope can withstand a maximum tension force of 620 N.



To what maximum angle, θ, can the block be pulled without the rope breaking?



$mg = 25\times9.8$

$$\cos\theta = \frac{25\times9.8}{620}$$

$$\theta = 66.7^\circ$$