

PP/559

17.

$$m = 284g$$

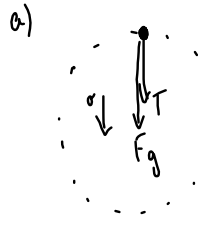
$$v = 12.4 \text{ m/s}$$

$$r = 0.850 \text{ m}$$

a) $T = ?$ (top)

b) $T = ?$ (bottom)

c) $v_{\text{max}} = ?$ ($T = 33.7 \text{ N}$)



$$F_{\text{net}} = ma$$

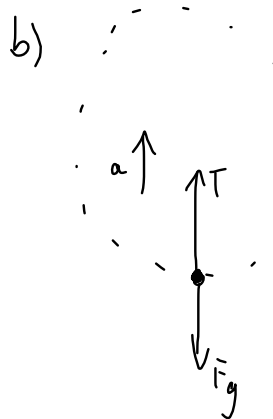
$$F_g + T = m \frac{v^2}{r}$$

$$T = m \frac{v^2}{r} - mg$$

$$T = \frac{(0.284 \text{ kg})(12.4 \text{ m/s})^2}{0.850 \text{ m}} - (0.284 \text{ kg})(9.81 \frac{\text{m}}{\text{s}^2})$$

$$T = 51.4 \text{ N} - 2.79 \text{ N}$$

$$T = 48.6 \text{ N}$$



$$F_{\text{net}} = ma$$

$$T - F_g = m \frac{v^2}{r}$$

$$T = m \frac{v^2}{r} + mg$$

$$T = 54.2 \text{ N}$$

c) $F_{\text{net}} = ma$

$$T - F_g = m \frac{v^2}{r}$$

$$33.7 \text{ N} - 2.79 \text{ N} = \frac{(0.284 \text{ kg})v^2}{0.850 \text{ m}}$$

$$30.9 \text{ N} = \frac{(0.284 \text{ kg})v^2}{(0.850 \text{ m})}$$

$$\frac{26.2735 \text{ N} \cdot \text{m}}{0.284 \text{ kg}} = v^2$$

$$92.5 \frac{\text{m}^2}{\text{s}^2} = v^2$$

$$v = 9.62 \text{ m/s}$$

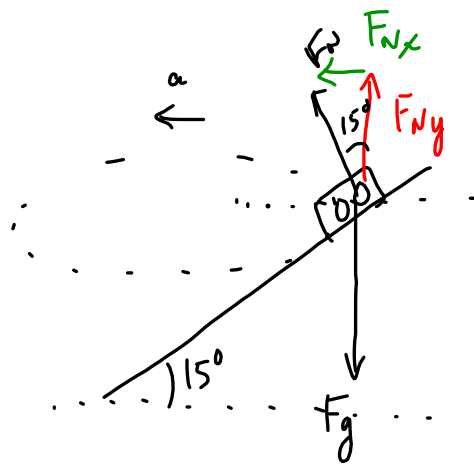
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21.

$$r = 65\text{m}$$

$$\theta = 15^\circ$$

$$v = ?$$



$$\tan 15^\circ = \frac{F_{Nx}}{F_{Ny}}$$

$$F_{Nx} = F_{Ny} \tan 15^\circ$$

$$F_{net} = \frac{mv^2}{r}$$

$$F_{Nx} = \frac{mv^2}{r}$$

$$F_{Ny} \tan 15^\circ = \frac{mv^2}{r}$$
~~$$mg \tan 15^\circ = \frac{mv^2}{r}$$~~

$$v^2 = gr \tan 15^\circ$$

$$v^2 = (9.8 \text{ m/s}^2)(65 \text{ m}) \tan 15^\circ$$

$$v = 13 \text{ m/s}$$