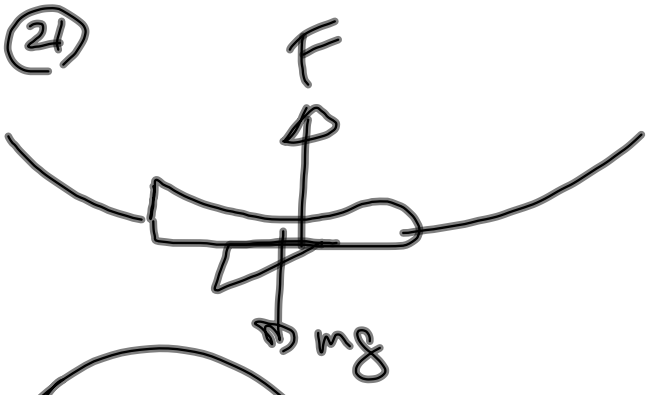
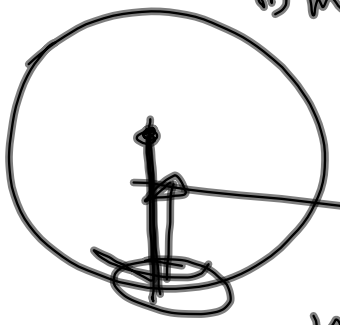
(21)





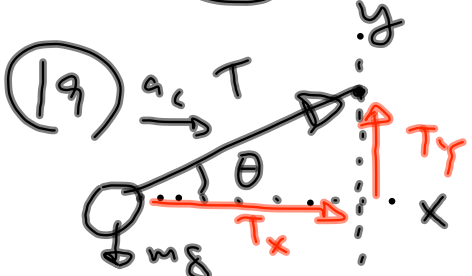
g_g

$a_c = \frac{v^2}{R}$

$g_g = \frac{v^2}{R} = \frac{(310\ m/s)^2}{R}$

$R = 1.1 \times 10^3\ m$

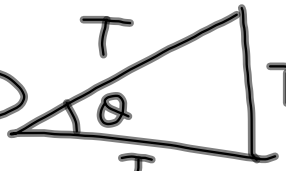
(19)



$m = 0.150\ kg$

$R = 0.600\ m$

2 rev/s



$\cos\theta = \frac{T_x}{T}$ $\quad T_x = F_T \cos\theta$

$\sin\theta = \frac{T_y}{T}$ $\quad T_y = F_T \sin\theta$

X: $F_T \cos\theta = \frac{mv^2}{R} = ma_c$

Y: $F_T \sin\theta - mg = 0 = ma^0$

$F_T \sin\theta = mg$

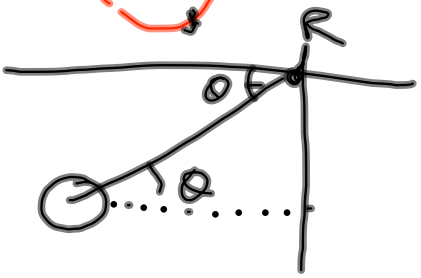
$F_T \cos\theta = \frac{mv^2}{R}$

$\Rightarrow \tan\theta = \frac{rg}{v^2}$

$v = 7.54\ m/s$

$= 0.103$

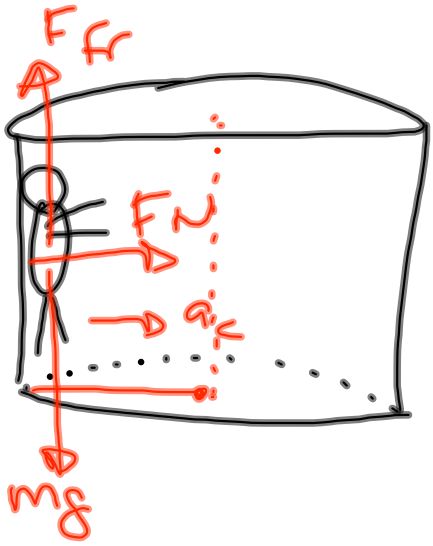
$\theta = 5.91°$



$F_T \sin\theta = mg$

$F_T = 14.3\ N$

(18)



$X: F_N = ma_c = \frac{mv^2}{R}$

$Y: F_{fr} - mg = ma = 0$

$F_{fr} = mg \quad F_N = \frac{mv^2}{R}$

$\mu_s F_N = mg$

$\mu_s \frac{mv^2}{R} = mg$

$V = \frac{2\pi R}{T} = 2\pi R f = 2\pi(5.0\,m)\left(0.50\,\frac{rev}{s}\right)$

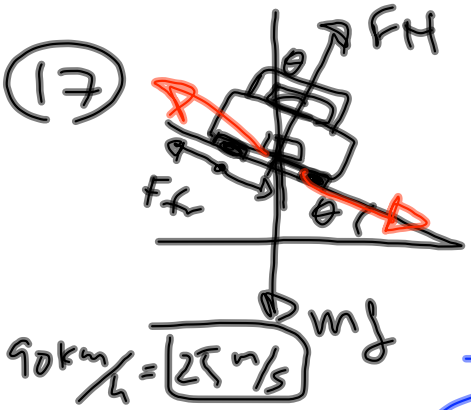
$T = \frac{1}{f}$ $\quad V = 15.7\,m/s$

$\mu_s \geq 0.20$

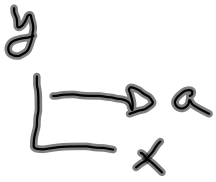
$\frac{\mu_s v^2}{R} = g$

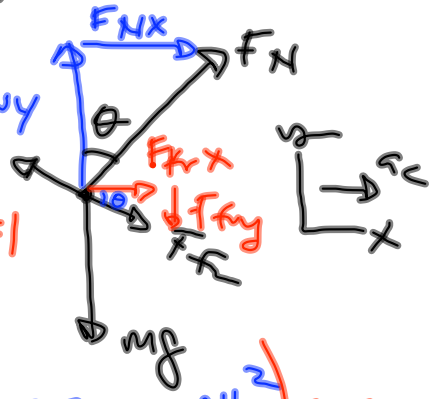
$\mu_s = \frac{gR}{v^2} = 0.20$

(17)



$90\,km/h = 25\,m/s$





$\cos^2\theta + \sin^2\theta = 1$

$X: F_{Nx} = \frac{mv_1^2}{R} = ma_c$

$F_N \sin\theta = \frac{mv_1^2}{R}$

$Y: F_{Ny} - mg = ma = 0$

$F_N \cos\theta = mg$

$\tan\theta = \frac{v_1^2}{gR}$ $\quad v_1 = 12.1\,m/s$

$+F_f$

$F_f = F_f$

$Y:$ $F_{N_2}\sin\theta + F_{fr}\cos\theta = \frac{mv_2^2}{R}$ $\cos\theta$

$Y:$ $F_{N_2}\cos\theta - F_{fr}\sin\theta - mg = 0$ $\sin\theta$

$F_{fr} = m\left[\frac{v_2^2}{R}\cos\theta - g\sin\theta\right]$

$0.0 + 10^{-2}$

(15) $a_R = \frac{v^2}{R}$

$a_R = \left[\frac{v}{t}\right] = \left[\frac{d}{t^2}\right] = \left[\frac{L}{T^2}\right]$

$v^2 = \left[\left(\frac{d}{t}\right)^2\right] = \left[\left(\frac{L}{T}\right)^2\right] = \left[\frac{L^2}{T^2}\right]$

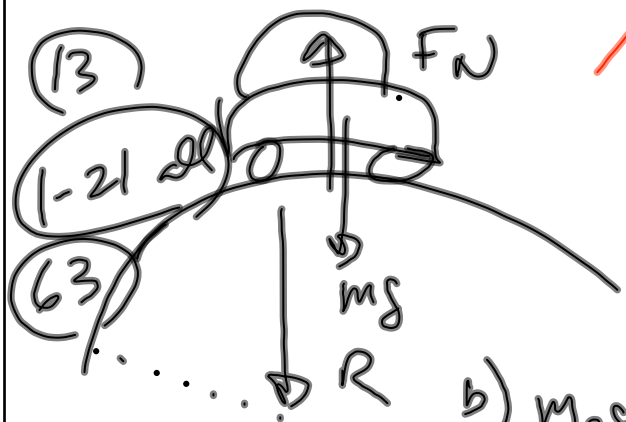
$[r] = [d] = [L]$

$\frac{v^2}{R} = \left[\frac{L^2}{T^2}\right] = \left[\frac{L^2}{T^2}\right] / [L] = \left[\frac{L}{T^2}\right]$

(13)

(1-21)

(63)



a) $\Sigma F = ma$

$m_c g - F_{N_c} = \frac{mv^2}{R}$

$F_{Nc} = 5.8 \times 10^3 N$

b) $m_p g - F_{N_p} = \frac{mv^2}{R}$

$F_{Np} = 4.1 \times 10^2 N$

c) $m_c g - F_{N_c} = \frac{mv^2}{R}$ ^{0}

$v = 31 \frac{m}{s}$

(3) $a_R = \frac{v^2}{R} = \left(\frac{2\pi r}{T}\right)^2 / R = \frac{4\pi^2 R}{T^2}$

$R = 1.50 \times 10^{11} m$

$T = 3.16 \times 10^7 s$