

1)

$$R = 1 \text{ m}$$

$$\omega = \frac{3\pi}{2} \frac{\text{rad}}{\text{s}}$$

$$m = 2 \text{ kg}$$

$$F_p = m \omega^2 R$$

$$F_v = \frac{mv^2}{R}$$

$$m \omega^2 R = \frac{mv^2}{R}$$

$$m \omega^2 R^2 = mv^2$$

$$v^2 = \omega^2 R^2$$

$$v^2 = (\omega \cdot R)^2$$

$$v = \omega R$$

$$v = \frac{3\pi}{2} \cdot 1 = \frac{3\pi}{2} \frac{\text{m}}{\text{s}}$$

$$\omega = \frac{v}{R}$$

$$\omega = \frac{3\pi}{2} \cdot 1 = \frac{3\pi}{2} \frac{\text{rad}}{\text{s}}$$

$$F_r = T$$

$$F_r = m \omega^2 R$$

$$T = m \omega^2 R$$

$$T = 2 \cdot \frac{9\pi^2}{4} = \frac{18\pi^2}{4} \text{ N}$$

2)

$$V = \omega R$$

$$\omega = \frac{V}{R}$$

$$\omega = \frac{V_1}{l_1}$$

$$\omega = \frac{V_2}{l_2 + l_1}$$

$$\sum F_R = m \omega^2 R$$

$$\sum F_R = T$$

$$T = m \omega^2 R$$

$$T = M_2 \left( \frac{V_2}{l_2 + l_1} \right)^2 (l_2 + l_1)$$

$$T = M_1 \left( \frac{V_1}{l_1} \right)^2 l_1$$

$$T_1 = 2T$$

$$T_2 = \frac{2T_1}{\frac{V_2}{l_2 + l_1}}$$



$$k_0 \Sigma F_R = k |\Delta l|$$

$$\Sigma F_T = 0$$

$$\Sigma F_R = m \omega^2 R$$

$$k |\Delta l| = m \omega^2 R$$

$$\omega^2 = \frac{k |\Delta l|}{m R}$$

$$\omega = \sqrt{\frac{k |\Delta l|}{m R}}$$

4)  $R = 0.25 \text{ m}$

$$k = 200 \frac{\text{N}}{\text{m}}$$

$$m = 2 \text{ kg}$$

$$\Sigma F_R = N + k |\Delta l|$$

$$\Sigma F_R = m \omega^2 R$$

$$N + k |\Delta l| = m \omega^2 R$$

$$\frac{N + k |\Delta l|}{m R} = \omega^2$$

$$\omega = \sqrt{\frac{N + k |\Delta l|}{m R}}$$

$$\omega = 13.4 \text{ rad/s}$$

$$m \omega^2 R = 100$$

$$\omega^2 = \frac{100}{0.25} = 400$$

$$\omega = 20$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{20} = 0.314 \text{ s}$$





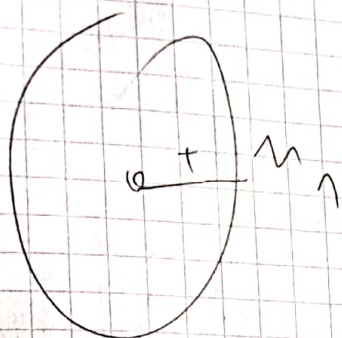


6)

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

$$v^2 = gR$$

7)



$$\sum F_R = m\omega^2 R$$

$$\sum F_R = T$$

$$T = m\omega^2 R$$

$$R = \frac{T}{m\omega^2}$$

8)

$$\sin(\theta) = \frac{R}{l}$$

$$R = l \cdot \sin(\theta)$$

$$T \cos(\theta) = mg$$

$$T = \frac{mg}{\cos(\theta)}$$

$$\sum F_y = mg - T \cos(\theta)$$

$$\sum F_R = T \sin(\theta)$$

$$\sum F_R = m\omega^2 R$$



$$m\omega^2 R = T \sin(\theta)$$

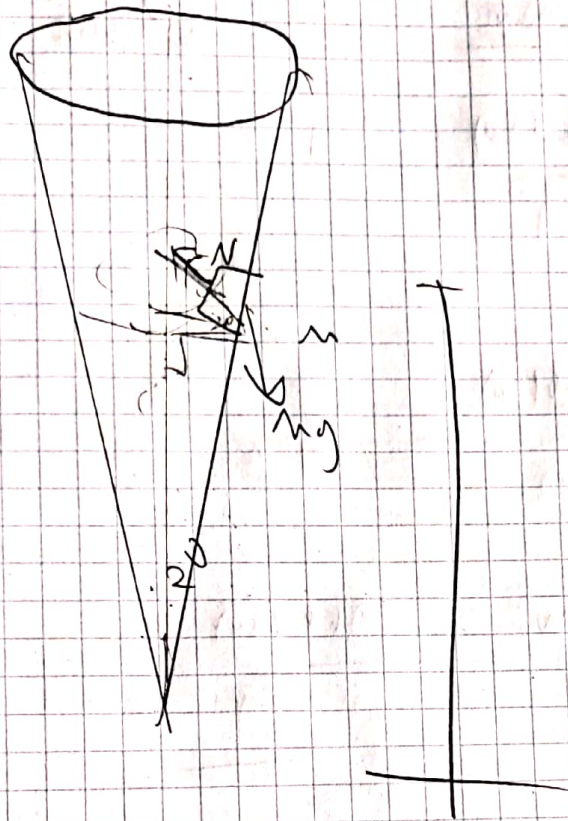
$$m\omega^2 l \sin(\theta) = T \sin(\theta)$$

$$\omega = \frac{T}{m l}$$

$$\omega = \sqrt{\frac{mg \cos(\theta)}{m l}} = \frac{g}{l \cos(\theta)}$$



9)



7. ~~10~~

$$F_Q = m \omega^2 R$$

$$F_R = N \cdot \cos(2\theta)$$

$$F_R = \frac{m g}{\sin(2\theta)} \cdot \cos(2\theta)$$

$$\frac{m g \cos(2\theta)}{\sin(2\theta)} = m \omega^2 R$$

$$m g = N \cdot \sin(2\theta)$$

$$N = \frac{m g}{\sin(2\theta)}$$

$$\tan(2\theta) = \frac{R}{h}$$

$$h = \frac{R}{\tan(2\theta)}$$

$$R = \frac{m g \cdot \cos(2\theta)}{m \omega^2 \sin(2\theta)}$$

$$m g \cos$$

$$h = \frac{g \cos(20)}{\omega^2 \sin(20)}$$

$$\frac{\tan(20)}{1}$$

$$= \frac{g \cos(20)}{\omega^2 \sin(20)} \cdot \frac{1}{\tan(20)}$$



$$T = \frac{2\pi}{\omega}$$

$$T = \frac{\frac{2\pi}{\omega}}{\frac{3\pi}{2}}$$

$$= \frac{2\pi}{1} \cdot \frac{2}{3\pi} = \frac{4}{3} \text{ sec}$$

10)

$$m\omega = mg \cos \theta$$

$$m\omega^2 R = mg \cos \theta$$

$$R = \frac{g \cos \theta}{\omega^2}$$

11) 11) 11) 11) 11)

$$m\omega = mg \cos \theta$$

$$\frac{m\omega^2}{R} = mg \cos \theta$$

$$m\omega^2 = R mg \cos \theta$$

$$\omega^2 = R g \cos \theta$$

$$|\omega| = \sqrt{R g \cos \theta}$$



721

$$\Sigma F_R: T = mg$$

$$T = mg$$

$$mg = \cancel{M} \omega^2 R$$

$$mg = \cancel{M} \omega^2 R$$

$$R = \frac{mg}{\cancel{M} \omega^2}$$

$$\Sigma F_R = \cancel{M} \omega^2 R + T$$

$$\cancel{M} \omega^2 R + T =$$

$$\cancel{M} \omega^2 R + mg = \cancel{M} \omega^2 R$$

$$R = \frac{\cancel{M} \omega^2 R + mg}{\cancel{M} \omega^2}$$