

$$a = 0.400 \text{ m}$$

$$b = 0.300 \text{ m}$$

$$c = 0.500 \text{ m}$$

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$$\vec{F}_{13}$$

$$\vec{F}_{12} = \frac{(6.67 \times 10^{-11})(0.300)(0.300)}{(0.400)^2} (+\hat{j})$$

$$\vec{F}_{12} = 3.75 \times 10^{-11} \hat{j} \text{ N}$$

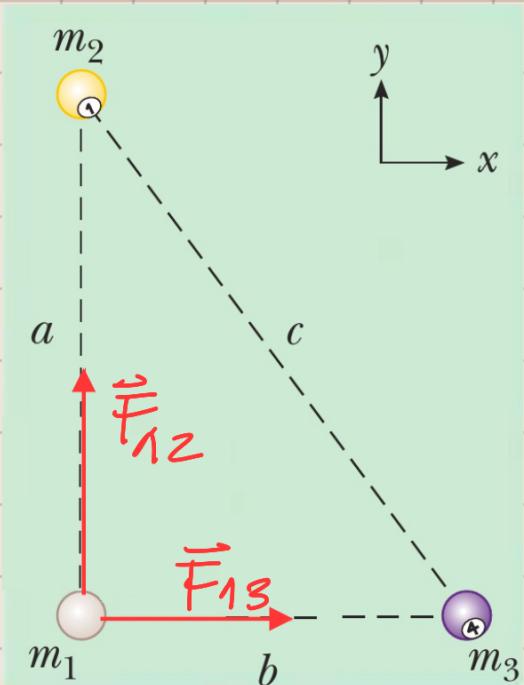
$$\vec{F}_{13} = \frac{(6.67 \times 10^{-11})(0.300)(0.300)}{(0.300)^2} (+\hat{i})$$

$$\vec{F}_{13} = 6.67 \times 10^{-11} \hat{i} \text{ N}$$

$$F = \sqrt{(6.67 \times 10^{-11})^2 + (3.75 \times 10^{-11})^2}$$

$$F = 7.65 \times 10^{-11} \text{ N}$$

$$\theta = \tan^{-1} \left( \frac{3.75}{6.67} \right) = 29.3^\circ$$



$$a = 0.500 \text{ m}$$

$$b = 0.400 \text{ m}$$

$$\vec{F}_{12} = \frac{(6.67 \times 10^{-11})(0.300)(0.300)}{(0.500)^2} (+\hat{j})$$

$$\vec{F}_{13} = 2.40 \times 10^{-11} (+\hat{i}) \text{ N}$$

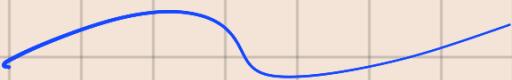
$$\vec{F}_{13} = \frac{(6.67 \times 10^{-11})(0.300)(0.300)}{(0.400)^2} (+\hat{i})$$

$$\vec{F} = 3.75 \times 10^{-11} (+\hat{i}) \text{ N}$$

$$F = \sqrt{(3.75 \times 10^{-11})^2 + (2.40 \times 10^{-11})^2}$$

$$F = 4.45 \times 10^{-11} \text{ N}$$

$$\theta = \tan^{-1} \left( \frac{3.75}{2.40} \right) = 57.1^\circ$$



$$R = 600 \text{ km} \quad g = 0.810 \text{ m/s}^2$$

$$F = mg$$

$$\frac{GMm}{r^2} = mr\ddot{\theta} \quad M = \frac{gr^2}{G}$$

$$M = \frac{(0.810) (600 \times 10^3)^2}{6.67 \times 10^{-11}}$$

$$M = 4.3718 \times 10^{21} \text{ Kg}$$

$$N = \sqrt{\frac{2(6.67 \times 10^{-11})(4.3718 \times 10^{21})}{600 \times 10^3}}$$

$$N = 985.9006 \text{ m/s}$$

$$\frac{GMm}{r^2} = mr\ddot{\theta} \quad r = \frac{GM}{\dot{\theta}^2}$$

$$\frac{GM}{r} = N^2 \rightarrow r = \frac{GM}{N^2}$$

$$r = \frac{(6.67 \times 10^{-11})(4.3718 \times 10^{21})}{(540)^2}$$

$$r = 999,994 \cdot 78 \text{ m}$$

$$r = h + r_p$$

$$999,994 \cdot 78 = h + 600,000$$

$$h = 399,994 \cdot 78 \text{ m}$$

$$R = 2450 \text{ km} \quad g = 8.250 \text{ m/s}^2$$

$$M = 7.42 \times 10^{23} \text{ Kg}$$

$$N = 1,358.07 \text{ m/s}$$

$$h = 549,808.67 \text{ m}$$

$$k = 305 \text{ N/m} \quad A = 28.0 \text{ cm}$$

$$m = 0.260 \text{ Kg}$$

$$\omega = \sqrt{\frac{305}{0.260}} = 34.2502 \text{ rad/s}$$

$$y(0) = 0 = 0.28 \cos [\omega(0) + \phi]$$

$$\phi = \pi/2$$

$$y(t) = 0.280 \cos(34.25 t + \pi/2)$$

$$-0.280 = 0.280 \cos(34.25 t + \pi/2)$$

$$-1 = \cos(34.25 t + \pi/2)$$

$$t = \frac{\pi/2}{34.2502} = 0.0459 \text{ s}$$

$$N_{\max} = (34.2502)(0.28) = 9.59 \text{ m/s}$$

~~$$\frac{1}{2}Kx^2 + \frac{1}{2}mN^2 = \frac{1}{2}KA^2$$~~

$$Kx^2 + mN^2 = KA^2$$

$$N = w \sqrt{A^2 - x^2}$$

$$N = 34.2502 \sqrt{0.280^2 - 0.100^2}$$

$$N = 8.9576 \text{ m/s}$$



$M = 2.00 \text{ kg}$

$0.500 \text{ m}$

$A = 0.1250 \text{ m}$

$$T = \frac{30\text{ s}}{10} = 3.0\text{ s}$$

$$\omega = \frac{2\pi}{3} = 2.0944 \text{ rad/s}$$

$$N = (0.125)(2.0944) = 0.2618 \text{ m/s}$$

$$(2.0944)^2 = \frac{k}{2}$$

$$k = 8.7750 \text{ N/m}$$

$$y(0) = -0.125 = 0.125 \cos \phi$$

$$\phi = \pi \text{ rad}$$

$$N = 2.0944 \sqrt{0.125^2 - 0.05^2}$$

$$N = 0.2391 \text{ m/s}$$



$$M_b = 20 \text{ Kg}$$

$$r = 0.150 \text{ m}$$

$$M_b = 30 \text{ Kg}$$

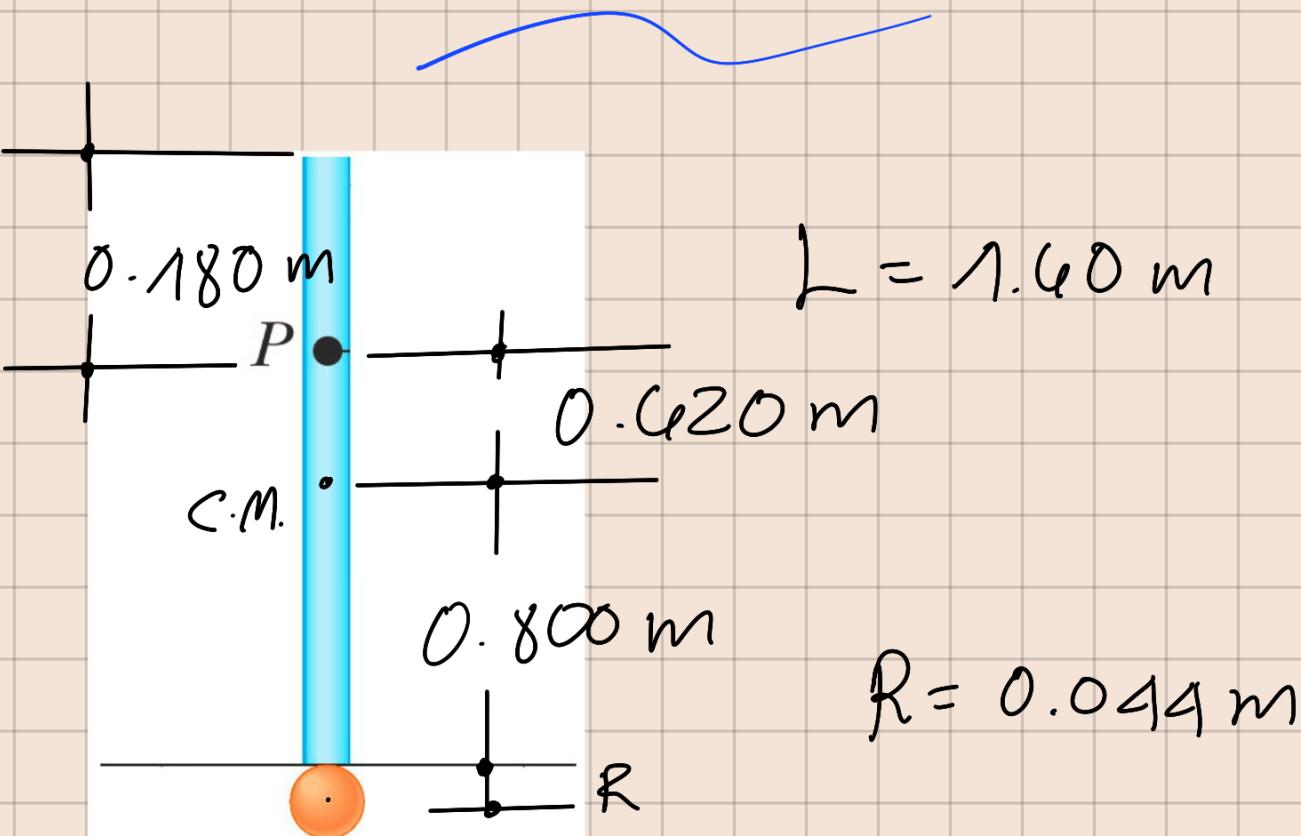
$$L = 0.700 \text{ m}$$

$$I = \frac{1}{2} (20) (0.150)^2 + \frac{1}{12} (30) (0.7)^2 + 30 (0.5)^2$$

$$I = 8.95 \text{ Kg-m}^2$$

$$y_{cm} = \frac{(10)(20) + (0.5)(30)}{50} = 0.30 \text{ m}$$

$$T = 2\pi \sqrt{\frac{8.95}{(0.3)(50)(9.8)}} = 1.5504 \text{ s}$$



$$R = 0.044 \text{ m}$$

$$I = \frac{1}{12} (1.50)(1.60)^2 + 1.50(10.02)^2 + \frac{z}{3} (2.5)(0.0441)^2 + 2.50(1.404)^2$$

$$I = 4.258 \text{ kg-m}^2$$

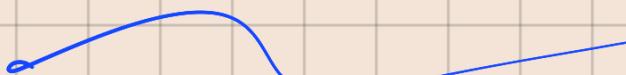
$$J_{cm} = \frac{(0.02)(1.5) + (1.464)(2.5)}{4.0}$$

$$J_{cm} = 1.1475 \text{ m}$$

$$T = 2\pi \sqrt{\frac{4.258}{(1.1475)(4)(9.8)}}$$

$$T = 2.3436 \text{ s}$$

la



$$y = 0.150 \sin(0.8x - 50t)$$

$$a_{max} = (0.150)(-50)^2 = 375 \text{ m/s}^2$$

$$\sum F = Ma = \left(0.012 \frac{\text{kg}}{\text{m}}\right) (0.01 \text{ m}) (375)$$

$$\sum F = 0.045 \text{ N}$$

$$N = \frac{50}{0.8} = 62.5 \text{ m/s}$$

$$T = (62.5)^2 (0.012) = 46.9 \text{ N}$$

$$\text{Con } \mu = 0.020 \text{ kg/m}$$

$$\sum F = (0.020)(0.01)(375)$$

$$\sum F = 0.075 \text{ N}$$

$$T = (62.5)^2 (0.020)$$

$$T = 78.125 \text{ N}$$

