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1.) Dik : $M_1 = 4 \text{ kg}$
 $M_2 = 2 \text{ kg}$
 $I = 0,12 \text{ kgm}^2$
 $r_1 = 30 \text{ cm}$
 $r_2 = 20 \text{ cm}$

Dit : a.) $a_1 = ?$
 $a_2 = ?$
b.) $T_1 = ?$
 $T_2 = ?$
c.) $E_k = ?$

Tinjau m_1

$$\sum F_1 = m_1 a$$

$$m_1 g - T_1 = m_1 a$$

$$40 - T_1 = 4a$$

$$40 + 4a = T_1$$

Tinjau m_2

$$\sum F_2 = m_2 a$$

$$m_2 g - T_2 = m_2 a$$

$$20 - T_2 = 2a$$

$$20 + 2a = T_2$$

Tinjau Katrol

$$\sum \tau = I \cdot \alpha$$

$$R_1 \cdot T_1 - R_2 \cdot T_2 = 0,12 \cdot \alpha$$

$$0,3(40 + 4a) - 0,2(20 + 2a) = 0,12 \cdot \alpha$$

$$0,3(40 + 4a) - 0,2(20 + 2a) = 0,12 \alpha$$

$$12 + 0,36 \alpha - 0,68 \alpha - 4 = 0,12 \alpha$$

$$8 = 0,56 \alpha$$

$$\alpha = 14,28 \text{ rad/s}^2$$

a.) $a_1 = \alpha_1 \cdot R_1$

$$= 14,28 \cdot 0,3 = 4,28 \text{ m/s}^2 //$$

$a_2 = \alpha_2 \cdot R_2$

$$= 14,28 \cdot 0,2 = 2,86 \text{ m/s}^2 //$$

b.) $T_1 = 40 + 4 \cdot 4,28$

$$= 40 + 17,12$$

$$= 57,12 \text{ N} //$$

$$T_2 = 20 + 2 \cdot 2,86$$

$$= 25,72 \text{ N} //$$

c.) $\omega_t = \omega_0 + \alpha t$

$$= 0 + 14,28 \cdot 4$$

$$= 57,12 \text{ rad/s}$$

$$E_k = \frac{1}{2} \cdot I \cdot \omega^2$$

$$= \frac{1}{2} \cdot 0,12 \cdot 57,12^2$$

$$= 195,8 //$$

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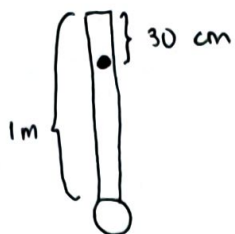
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Kuis Fisika 2

3.) Dik : $m_b = 2 \text{ kg}$

$m_r = 1 \text{ kg}$

$r = 10 \text{ cm}$



Dit : a.) $Y_{pm} = ?$

b.) $I_{tot} = ?$

c.) $f = ?$

$$a.) Y_{pm} = \frac{Y_b m_b + Y_r m_r}{m_b + m_r}$$

$$= \frac{0,2 \cdot 2 + 0,8 \cdot 1}{2 + 1}$$

$$= \frac{0,4 + 0,8}{3} = \frac{1,2}{3}$$

$$= 0,4 \text{ m dari poros}$$

$$b.) I_b = \frac{1}{12} m_b L^2 + m_b d^2$$

$$= \frac{1}{12} \cdot 2 \cdot 1^2 + 2 (0,2)^2$$

$$= \frac{1}{6} + 0,08 = \frac{50 + 24}{300} = 0,246$$

$$I_r = \frac{1}{2} m_r r^2 + m_r d^2$$

$$= \frac{1}{2} \cdot 1 \cdot (0,1)^2 + 1 \cdot (0,8)^2$$

$$= \frac{1}{2} \cdot 0,01 + 1 \cdot 0,64$$

$$= 0,005 + 0,64$$

$$= 0,645$$

$$I_{tot} = I_b + I_r$$

$$= 0,246 + 0,645 = 0,891 \text{ kgm}^2$$

$$c.) \Sigma \tau = I_{tot} \cdot \alpha$$

$$- m_g \sin \theta \cdot Y_{pm} = 0,891 \alpha$$

$$- m_g \sin \theta \cdot 0,4 = 0,891 \alpha$$

$$g \cdot (m_b + m_r) \sin \theta \cdot 0,4 = 0,891 \alpha$$

$$- 3,9 \sin \theta \cdot 0,4 = 0,891 \alpha$$

$$- 1,29 \sin \theta = 0,891 \alpha$$

$$0,891 \alpha + 1,29 \sin \theta = 0$$

$$0,891 \alpha + 1,29 \sin \theta = 0$$

$$\alpha + 1,349 \sin \theta = 0$$

$$\frac{d^2 \theta}{dt^2} + 1,349 \sin \theta = 0$$

$$\omega = \sqrt{1,349} = 2\pi f$$

$$f = \frac{1}{2\pi} \cdot \sqrt{1,349}$$

$$= \frac{\sqrt{1,349}}{2\pi}$$

$$= 0,5026 \text{ Hz}$$

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4.) a.) $x_1 = 3 \sin 2\pi t$

$$x_2 = 4 \sin (2\pi t + 5\pi/6)$$

$$x = A \sin (\omega t + \phi)$$

$$A^2 = A_1^2 + A_2^2 + 2A_1A_2 \cos (\phi_2 - \phi_1)$$

$$= 3^2 + 4^2 + 2 \cdot 3 \cdot 4 \cos (5\pi/6)$$

$$= 144 + 24 \cos 150^\circ$$

$$= 144 + 24(-\frac{1}{2}\sqrt{3})$$

$$A^2 = 144 - 12\sqrt{3}$$

$$A = \sqrt{144 - 12\sqrt{3}}$$

$$\phi = \arctan \left[\frac{A_1 \sin \phi_1 + A_2 \sin \phi_2}{A_1 \cos \phi_1 + A_2 \cos \phi_2} \right]$$

$$= \arctan \left[\frac{3 \sin 0^\circ + 4 \sin 150^\circ}{3 \cos 0^\circ + 4 \cos 150^\circ} \right]$$

$$= \arctan \left[\frac{0 + 4(\frac{1}{2})}{3 + 4(-\frac{1}{2}\sqrt{3})} \right]$$

$$= \arctan \left[\frac{2}{3 - 2\sqrt{3}} \right]$$

$$= \arctan (11,65)$$

$$= 85,1^\circ$$

$$\therefore x = \sqrt{144 - 12\sqrt{3}} \cos (2\pi t + 85,1^\circ)$$

b.) $x = 4 \cos 10t$

$$y = 5 \sin 10t = 5 \cos 10t - \frac{\pi}{2}$$

$$\phi = \phi_2 - \phi_1$$

$$= 0 - \frac{\pi}{2} = -\frac{\pi}{2}$$

$$\sin^2 \phi = \frac{y^2}{A_y^2} - \frac{2xy}{A_x A_y} \cos \phi + \frac{x^2}{A_x^2}$$

$$1 = \frac{y^2}{A_y^2} - 0 + \frac{x^2}{A_x^2}$$

$$1 = \frac{y^2}{5^2} + \frac{x^2}{4^2}$$

$$1 = \frac{y^2}{25} + \frac{x^2}{16} //$$

2.) Dik : $m = 50g$

$$r_b = 10 \text{ cm}$$

$$r_c = 0,75 \text{ m}$$

$$\text{dik} = L \text{ saat } y = 0,5 \text{ m}$$

$$v = \sqrt{2gh} = \sqrt{2 \cdot 10 \cdot 0,5} = 3,2 \text{ m/s}$$



$$L = mrv$$

$$= 0,05 \cdot 0,75 \cdot 3,2$$

$$= 0,12 \text{ kg m}^2/\text{s}$$