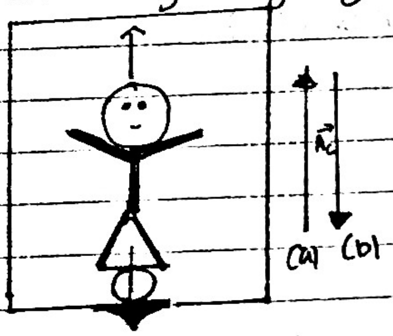
Nama : Tri Lestari
Npm : 2013022058
Kelas : B

Penyelesaian:

S.1. (a). Pengamat non-inersia percaya bahwa ia berada dalam kesetimbangan bahwa gaya total yang berkerja padanya adalah nol. Skala memberikan gaya ke atas, $\vec{N}$, yang nilainya sama dengan skala yang membaca "Berat" W, dari pengamat dalam kerangka yang dipercepat dengan demikian




$$\vec{N} + m\vec{g} - m\vec{A}_0 = 0$$
$$N - mg - mA_0 = N - mg - m\frac{g}{4} = N - \frac{5}{4}mg = 0$$
$$W' = N = \frac{5}{4}mg = \frac{5}{4}W$$
$$W' = 150 \text{ lb}$$

(b). percepatan ke bawah, searah dengan $\vec{g}$

$$N - mg + m\left(\frac{g}{4}\right) = 0 \qquad W = W - \frac{W}{4} = \frac{3}{4}W$$

S.2. Penyelesaian:

(a). $f_{cent} = -m\vec{\omega} \times (\vec{\omega} \times \vec{r})$

Untuk $\vec{\omega} \perp \vec{r}$, $\vec{f}_{cent} = m\omega' r' e_r'$

$$\omega = 500\ s^{-1} = 1000\ \pi s^{-1}$$
$$\vec{f}_{cent} = 10^{-6} \times (1000\ \pi)^2 \times 5\,\vec{e}_r = 5\pi^2$$

(b) $$\frac{f_{cent}}{f_g} = \frac{m\omega^2 r'}{mg} = \frac{(1000\ \pi)^2\, 5}{980} = 5.04 \times 10^4$$

S.3. Penyelesaian:

$$m\vec{g} + \vec{T} - m\vec{A} = 0 \qquad \text{(Lihat Gambar S.1.2)}$$
$$-mg\,\hat{j} + T\cos\theta\,\hat{j} + T\sin\theta\,\hat{i} - m\left(\frac{g}{10}\right)\hat{i} = 0$$
$$T\cos\theta = mg, \text{ dan } T\sin\theta = \frac{mg}{10}$$
$$\tan\theta = \frac{1}{10}, \quad \theta = 5.71$$

$$T = \frac{mg}{\cos\theta} = 1.005\ mg$$

NAMA : SHOLEH MUTIARA.
NPm : 2013022048.

No.

Date:

(5.4) The non-inertial observer thinks that $\vec{g}'$ points downward in the direction of the hanging plumb bob... thus.

$$\vec{g}' = \vec{g} - \vec{A}_1 = g\hat{j} - \frac{g}{10}\hat{i}$$

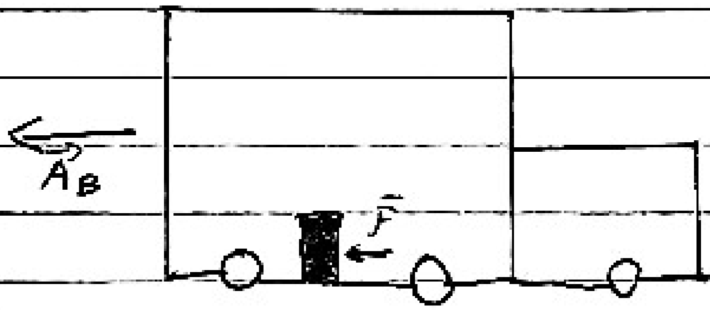
For small oscillations of a simple pendulum.

$$T = 2\pi\sqrt{\frac{l}{g}}$$

$$g' = \sqrt{g^2 + \left(\frac{g}{10}\right)^2} = 1.005\,g.$$

$$T = 2\pi\sqrt{\frac{l}{1.005g}} = 1.995\,\pi\sqrt{\frac{l}{g}}$$

(5.5) (a) $F = -\mu mg$ is the frictional force acting on the




box. so

$\vec{F} - m\vec{A}_0 = m\vec{a}'$ ($\vec{a}'$ is the acceleration of the box relative to the truck. see equation 5.1.4b) now $\vec{F}$ the only real force acting horizontally, so the accelaration relative to the road is.

(b). $a = \frac{F}{m} = -\frac{\mu mg}{m} = -\mu g = -\frac{g}{3}.$

(for + in the direction of the moving truck, the - indicates that friction opposes the forward sliding of the box).

$A = -\frac{g}{2}$ (the truck is decelatating).

From above. $ma - mA_0 = ma'$ so.

(c) $a' = a - A_1 = -\frac{g}{3} + \frac{g}{2} = \frac{g}{6}.$

Nama : Ade Filla Vannessa
Npm : 2013022020

5.6 (a) $\bar{r} = i(x + R\cos\Omega_t) + jR\sin\Omega_t$

$\dot{\bar{r}} = -i\Omega R\sin\Omega t + j\Omega R\cos\Omega_t$

$\dot{\bar{r}} \cdot \dot{\bar{r}} = r^2$

$= \Omega^2 R^2 \quad : V = \Omega R$

(b) $\dot{\bar{r}} = \dot{\bar{r}} - \bar{\omega} \times \bar{r}$ where $\vec{r} = \hat{i}x + \hat{j}y^2$

$= -\hat{i}\,\Omega R\sin\Omega_t + j\,\Omega R\cos\Omega_t$

$= -i\Omega R\sin t + J\Omega R\cos\Omega_t - \omega\hat{k} \times (\hat{i}x' + \hat{j}y')$, $-Jwx' + iwy'$

$\dot{x} = wy' - \Omega\sin\Omega_t$

$\dot{y} = -wx^2 + \Omega R\cos\Omega_t$

(c) Let $u' = x' + iy'$ here $i = \sqrt{-1}$ !

$\dot{u}' = \dot{x}' + i\dot{y}' = wy - \Omega R\sin\Omega_t - iwx' + i\Omega R\cos\Omega_t$

$iwu' = \quad = -wy' + iwx'$

$\therefore \dot{u}' + iwu' = -\Omega R\sin\Omega_t + i\Omega R\cos\Omega_t = i\Omega R e^{\Omega}$

5.6 penyelesaian/solusi

$u' = Ae^{-w} + Be^{\Omega}$

$\dot{u} = iwAe^{-\Omega} + iwBe^{\Omega}$

$iwi = iwAe^{-\Omega} + iwBe^{\Omega}$

$;\ \dot{u} + iwu' = i(w + \Omega)Be \quad$ so $B = \frac{\Omega R}{w+\Omega}$

Also at $t=0$

$u = A + B = x'(0) + iy'(0) = x + R$

$;\ A = x_1 + R - B = x + R - \frac{\Omega R}{w+\Omega}$ so $A = x + \frac{wR}{w+\Omega}$

Thus $u' = \left[x + \frac{wR}{w+\Omega}\right]e + \frac{\Omega R}{w+\Omega}e\Omega$

5.7 $1^{w}$ : examine $\bar{A} - \bar{A} - \bar{\Omega} \times \bar{\Omega} \times \bar{r}$

$= \bar{\omega} \times \bar{\omega} \times \bar{R} - \bar{\Omega} \times \bar{\Omega} \times \bar{R}_E - \bar{\Omega} \times \bar{\Omega} \times (\bar{R} - \bar{R}_2)$

$= (\bar{\omega} \times \bar{\omega} - \bar{\Omega} \times \bar{\Omega}) \times \bar{R} = -(w^2 - \Omega^2)R$ note ; $\bar{\omega} = \omega\bar{k}$, $\bar{\Omega} = \Omega\bar{k}$

$\bar{a} = (\Omega^2 - w^2)\bar{R} - 2\bar{\Omega} \times \bar{p}$

$(i\bar{x} + j\bar{y}) = (\Omega^2 - w^2)[iR\cos(\Omega - w)t - JR\sin(\Omega - w)t] - 2j\Omega\dot{x} + 2i\Omega\dot{y}$

$\bar{x} = (\Omega^2 - w^2)R\cos(\Omega - w)t + 2\Omega\dot{y}$

$\bar{y} = (\Omega^2 - w^2)R\sin(\Omega - w)t - 2\Omega\dot{x}$

Let $= \bar{x} = (\Omega - w)\dot{y}$ and $\bar{y} = (\Omega - w)\dot{x}$