



kelompok 7 mek...

Ade Filla Fisika'20, Tri Le...



Tri Lestari Fisika'20

Assalamualaikum warahmatullahi wabarakatuh,

Disini saya sebagai ketua kelompok akan membagi tugas terkait tugas problems dari materi Noninertial Reference Systems (Bab V) pada buku Analytical mechanics (fowles dan cassiday.

Adapun problems yang harus di selesaikan yaitu 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 dan 5.7

20.00

Wa'alaikumsalam warahmatullahi wabarakatuh

20.14 ✓✓

Ade Filla Fisika'20

Wa'alaikumsalam warahmatullahi wabarakatuh

20.14

Iya aku udah dapet soalnya nih nanti aku kirim ya

20.15 ✓✓

5.1 A 120-lb person stands on a bathroom spring scale while riding in an elevator. If the elevator has (a) upward and (b) downward acceleration of $g/4$, what is the weight indicated on the scale in each case?

5.2 An ultracentrifuge has a rotational speed of 500 rps. (a) Find the centrifugal force on a i-jig particle in the sample chamber if the particle is 5 cm from the rotational axis. (b) Express the result as the ratio of the centrifugal force to the weight of the particle.

5.3 A plumb line is held steady while being carried along in a moving train. If the mass of



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5.3 A plumb line is held steady while being carried along in a moving train. If the mass of the plumb bob is m , find the tension in the cord and the deflection from the local vertical if the train is accelerating forward with constant acceleration $g/10$. (Ignore any effects of Earth's rotation.)

5.4 If, in Problem 5.3, the plumb line is not held steady but oscillates as a simple pendulum, find the period of oscillation for small amplitude.

5.5 A hauling truck is traveling on a level road. The driver suddenly applies the brakes, causing the truck to decelerate by an amount $W/2$. This causes a box in the rear of the truck to slide forward. If the coefficient of sliding friction between the box and the truckbed is μ , find the acceleration of the box relative to (a) the truck and (b) the road.

5.6 The position of a particle in a fixed inertial frame of reference is given by the vector $\mathbf{r} = i(x_0 + R \cos Qt) + jR \sin Qt$ where x_0 , R , and Q are constants.

(a) Show that the particle moves in a circle with constant speed.

(b) Find two coupled, first-order differential equations of motion that relate the components of position, x' and y' , and the components of velocity, $\dot{x}'$ and $\dot{y}'$, and of the particle relative to a frame of reference rotating with an angular velocity $\omega = k\omega$.

(c) Letting the fixed and rotating frames of reference coincide at times $t = 0$ and letting $\mathbf{u}' = x' + iy'$, find $\mathbf{u}'(t)$, assuming that $Q = \omega$. (Note: $i = \sqrt{-1}$.)

5.7 A new asteroid is discovered in a circular orbit of radius $41/3$ AU about the Sun. Its



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5.7 A new asteroid is discovered in a circular orbit of radius $41/3$ AU about the Sun. Its period of revolution is precisely 2 years. Assume that at $t = 0$ it is at its distance of closest approach to the Earth.

(a) Find its coordinates $[x(t), y(t)]$ in a frame of reference fixed to Earth but whose axes remain fixed in orientation relative to the Sun. Assume that the x-axis points toward the asteroid at $t = 0$.

(b) Calculate the velocity of the asteroid, relative to Earth, at $t = 0$.

(c) Find the x- and y-components of the acceleration of the asteroid in this frame of reference. Integrate them twice to show that the resulting positions as a function of time agree with part (a).

(d) Plot the trajectory of the asteroid as seen from the rotating frame of reference attached to Earth for its 2-year orbital period. (Hint: Use Mathematica's ParametricPlot graphing tool.)

20.15 ✓✓

Coba de dibagi 20.15 ✓✓

Ade Filla Fisika'20

Oke, jadi aku bagi ya
Tri 5.1 sampai 5.3
Sholea 5.4 sampai 5.5
Aku 5.6 sampai 5.7

20.17

Okey aku otw ngerjain yaa 20.18 ✓✓

1

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Jadi aku mau nanya untuk soalnya ditulis lagi



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Jadi aku mau nanya untuk soalnya ditulis lagi
gk?

20.18

Ade Filla Fisika'20

Langsung jawaban nya aja ya

20.19

Iya soalnya udah aku kirim

20.20 ✓✓

Jadi langsung Jawaban aja teman"

20.20 ✓✓

Tri Lestari Fisika'20

Oke siap

20.21

Ade Filla Fisika'20

Kalo udah ada yang dapet jawaban nya
langsung kirim kesini ya

20.29

Tri Lestari Fisika'20

Ade Filla Fisika'20

Kalo udah ada yang dapet jawaban nya
langsung kirim kesini ya

Oke ade

20.30

Oke siap

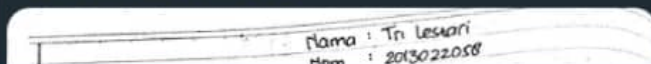
20.34 ✓✓

Tri Lestari Fisika'20

Temen-temen aku udh selesai untuk jawaban
Nomor 5.1, 5.2 dan 5.3

20.40

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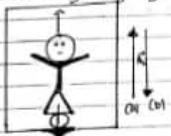


Tri Lestari Fisika'20

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, N , yang nilainya sama dengan skala yang membaca "Berat" w , dari pengamat dalam kerangka yang dipercepat dengan akselerasi



$$N + mg - m\ddot{x} = 0$$

$$N - mg - m\ddot{x} = 0 \quad N - mg - m\frac{g}{4} = N - \frac{5}{4}mg = 0$$

$$w' = N = \frac{5}{4}mg = \frac{5}{4}w$$

$$w' = 150 \text{ lb}$$

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

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

S.2. Penyelesaian:

(a). $\vec{F}_{\text{cent}} = -m\vec{\omega} \times (\vec{\omega} \times \vec{r})$
 Untuk $\vec{\omega} \perp \vec{r}$, $\vec{F}_{\text{cent}} = m\omega^2 r \hat{e}_r$
 $\omega = 500 \text{ s}^{-1} = 1000 \pi \text{ s}^{-1}$
 $\vec{F}_{\text{cent}} = 10^{-6} \times (1000 \pi)^2 \times 5 \hat{e}_r = 5 \pi^2$

(b) $\frac{F_{\text{cent}}}{mg} = \frac{m\omega^2 r}{mg} = \frac{(1000 \pi)^2 \times 5}{980} = 5.09 \times 10^{-4}$

S.3. Penyelesaian:

$$mg \hat{j} + T - m\ddot{x} = 0 \quad (\text{lihat Gambar S.1.2})$$

$$-mg \hat{j} + T \cos \theta \hat{j} + T \sin \theta \hat{i} - m\left(\frac{g}{10}\right) \hat{j} = 0$$

$$T \cos \theta = mg, \text{ dan } T \sin \theta = mg \left(\frac{1}{10}\right)$$

$$\tan \theta = \frac{1}{10}, \quad \theta = 5.71^\circ$$

$$T = mg \cdot 1.005 \text{ mg}$$

Ini untuk fotonya 20.40

Okey 20.42 ✓✓

Aku juga mau ngirim Jawaban ku ya teman-teman

20.43 ✓✓

Ini untuk nomor 5.4 dan 5.5 ya teman" 20.44 ✓✓

Nama : SYOLEN MUTHIA
NPM : 2013022018

5.4 The non-inertial observer thinks that a point mass m is in the direction of the hanging point below... thus,

$$\vec{a} = \vec{a} - \vec{A} = \frac{g}{10} \hat{j}$$

For small oscillations of a simple pendulum,

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


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1 Nama: SYOLEN MUTIARA
NPM: 2013022049

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

$$\vec{g}' = \vec{g} - \vec{a} = g\hat{j} - \frac{g}{3}\hat{j}$$

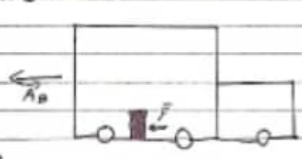
For small oscillations of a simple pendulum

$$T = 2\pi\sqrt{\frac{l}{g'}}$$

$$g' = \sqrt{g^2 + \left(\frac{g}{3}\right)^2} = 1.05g$$

$$T = 2\pi\sqrt{\frac{l}{1.05g}} = 1.005\pi\sqrt{\frac{l}{g}}$$

5.5 (a) $F = -kx$ is the frictional force acting on the



box so

$$F - ma = m\ddot{x} \quad (\ddot{x} \text{ is the acceleration of the box relative to the truck. See Equation 5.1.4b})$$

now F the only real force acting horizontally, so the acceleration relative to the road is

(b) $a = \frac{F}{m} = -\frac{kx}{m} = -\frac{m_0 g}{3}$

(For t in the direction of the moving truck, the indicates that friction opposes the forward sliding of the box).

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

From above, $ma - m_0 g = m\ddot{x}$ so

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

20.44 ✓✓

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Okey ini aku kirim jawaban ku ya, nomor 5.6 dan 5.7

20.46

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NPM: 2013022028

5.6 (a) $\vec{r} = (x + R \cos \theta)\hat{i} + (R \sin \theta)\hat{j}$

$$\vec{r}' = \dot{x}\hat{i} + R(-\sin \theta)\dot{\theta}\hat{i} + R\cos \theta\dot{\theta}\hat{j}$$

$$\vec{r} \cdot \vec{r}' = r^2 = \dot{r}^2 = v^2$$

(b) $\vec{F} = \vec{F}_c + \vec{F}_f$ where $\vec{F}' = \vec{r}' \cdot \hat{r}$

$$= -\dot{r} \frac{d}{dt} \left(\frac{1}{r} \right) + \frac{1}{r} \frac{d}{dt} (r^2 \dot{\theta})$$

$$= -\dot{r} \frac{1}{r} + \frac{1}{r} (2r\dot{\theta} + r^2 \ddot{\theta}) = -\frac{\dot{r}}{r} + 2\dot{\theta} + r\ddot{\theta}$$

$$\ddot{\theta} = \frac{1}{r} \left(\frac{d}{dt} (r^2 \dot{\theta}) - 2r\dot{\theta} \right)$$

$$\ddot{\theta} = \frac{1}{r} \left(\frac{d}{dt} (r^2 \dot{\theta}) - 2r\dot{\theta} \right)$$

(c) Let $\vec{u} = \dot{\vec{r}} + \vec{r}\ddot{\theta}$ where $\dot{\theta} = \sqrt{\frac{g}{R}}$

$$\vec{u}' = \ddot{\vec{r}} + \ddot{\theta}\vec{r} + \dot{\theta}\dot{\vec{r}} = \ddot{\vec{r}} + \ddot{\theta}\vec{r} + \dot{\theta}\dot{\vec{r}}$$

$$\ddot{\vec{r}} = \ddot{x}\hat{i} + \ddot{y}\hat{j} = \ddot{x}\hat{i} + \ddot{y}\hat{j}$$

$$\ddot{\theta} = \frac{1}{r} \left(\frac{d}{dt} (r^2 \dot{\theta}) - 2r\dot{\theta} \right)$$

$$\ddot{\theta} = \frac{1}{r} \left(\frac{d}{dt} (r^2 \dot{\theta}) - 2r\dot{\theta} \right)$$


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Ade Filla Fisika'20, Tri Le...



Okey ini aku kirim jawaban ku ya, nomor 5.6 dan 5.7

20.46

20.47

Kan kita udh selesai semua ngerjain tugas kelompok nya, ini aku jadiin satu file ya?

20.48

lya tri 20.48 ✓✓

20.48 ✓✓

Kasih nama filenya 20.48

20.48

Kelompok 1_Diskusi Soal chapter 5 20.48 ✓✓

20.48 ✓✓



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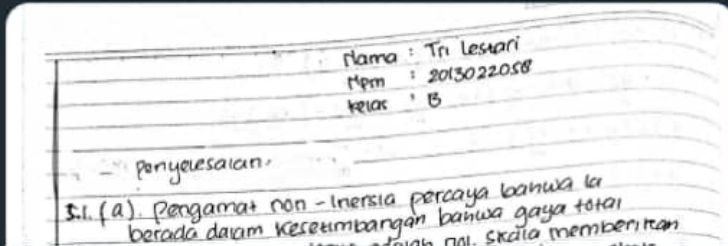


Iya tri 20.48 ✓✓

Kasih nama filenya 20.48 ✓✓

Kelompok 1_Diskusi Soal chapter 5 20.48 ✓✓

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Kelompok 7_B_ Diskusi Tugas...

3 halaman • 557 kB • PDF

21.06

Dh bener blm temen"? 21.06

Iya sudah benar 21.09 ✓✓

Di up di vc mekanika kelas B ya 21.09 ✓✓

Perwakilan aja 21.09 ✓✓

Tri Lestari Fisika'20

Anda

Di up di vc mekanika kelas B ya

Iya shol 21.10

Tri Lestari Fisika'20

Anda



Kirim pesan





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Dh bener blm temen"?

21.06

Iya sudah benar

21.09 ✓✓

Di up di vc mekanika kelas B ya

21.09 ✓✓

Perwakilan aja

21.09 ✓✓

Tri Lestari Fisika'20

Anda

Di up di vc mekanika kelas B ya

Iya shol

21.10

Tri Lestari Fisika'20

Anda

Perwakilan aja

Yaps bener

21.10

Oke berhubungan diskusi dan tugas kita sudah selesai, saya selaku ketua kelompok mengucapkan terimakasih atas kerja samanya



Wassalamu'alaikum warahmatullahi wabarakatuh

21.10

Wa'alaikumsalam warahmatullahi wabarakatuh

21.22 ✓✓

Ade Filla Fisika'20

Wa'alaikumsalam warahmatullahi wabarakatuh

21.22



Kirim pesan

