

## #KUIS 1

No. 801010  
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①  $u = 3t - 4t^2 + t^3$   
 $u$  (meter) &  $t$  (detik)

Dit: posisi objek!

awaktu  $t = 1s$ 

$$t = 2s$$

$$t = 3s$$

$$t = 4s$$

b. perpindahan objek  $t = 0s$  &  $t = 4s$ c. Vavg objek  $t = 2s$  sampai  $t = 4s$ d. grafik  $u$  terhadap  $t$   $0 \leq t \leq 4$ Jawab: a.  $u = 3t - 4t^2 + t^3$ 

$$3(1) - 4(1)^2 + (1)^3$$

$$3 - 4 + 1 = -1 + 1 = 0 \text{ meter}$$

$$t = 2s$$

$$u = 3t - 4t^2 + t^3$$

$$= 3(2) - 4(2)^2 + (2)^3$$

$$= 6 - 16 + 8$$

$$= -10 + 8 = -2 \text{ meter}$$

$$t = 3s$$

$$u = 3(3) - 4(3)^2 + (3)^3$$

$$= 9 - 4 \cdot 9 + 27$$

$$= 9 - 36 + 27$$

$$= -27 + 27$$

$$= 0 \text{ meter}$$

$$t = 4s$$

$$= 3(4) - 4(4)^2 + (4)^3$$

$$= 12 - 64 + 64 = -52 + 64$$

$$= 12 \text{ meter}$$

b.  $t = 0s$

$$u = 3t - 4t^2 + t^3$$

$$= 3(0) - 4(0)^2 + (0)^3$$

$$= 0 - 0 + 0 = 0$$

$$t = 4s$$

$$u = 3(4) - 4(4)^2 + (4)^3$$

$$= 12 - 4 \cdot 16 + 64$$

$$= 12 - 64 + 64$$

$$= -52 + 64 = 12$$

Perpindahan:

$$\Delta u = u(4) - u(0)$$

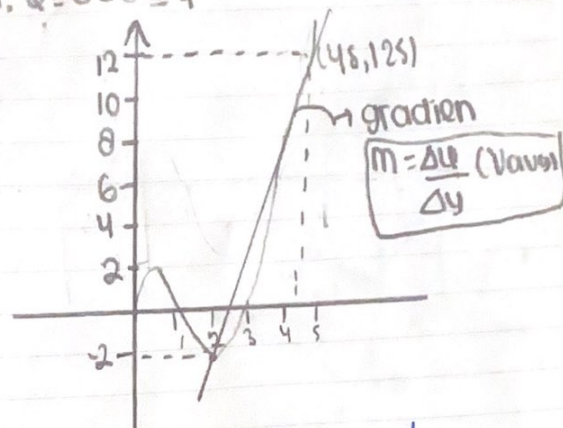
$$= 12 - 0 = 12 \text{ meter}$$

c.  $u = 3t - 4t^2 + t^3$

$$V_{avg} = \frac{\Delta u}{\Delta t} \hat{i} + \frac{\Delta y}{\Delta t} \hat{j}$$

$$= \frac{u(4) - u(0)}{4 - 0} \hat{i}$$

$$= \frac{12 - (-2)}{2} = \frac{14}{2} = 7 \text{ meter/s}$$

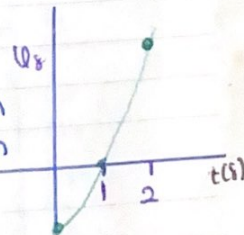
d.  $u = 0 \leq t \leq 4$ 

② Dik: a konstan

$$u_s = 6 \text{ m}$$

Dit: a) Besar percepatan

b) arah percepatan



Jawab:  $u(t) = u_0 + v_0 t + \frac{1}{2} a t^2$  9/18

$$\Rightarrow u = v_0 = 0$$

$$u(t) = \frac{1}{2} a t^2$$

$$t = 2s \text{ & } u = 6 \text{ m}$$

$$t = 2s \Rightarrow u(t) = \frac{1}{2} a t^2$$

$$6 \text{ m} = \frac{1}{2} a (2)^2$$

$$a = 3 \text{ m/s}^2$$

di arah positif sumbu  $y$   
 ③ satu benda titik bergerak dgn persamaan:

$$r(t) = (5t\hat{i} + (31,25 - 5t^2)\hat{j}) \text{ m}$$

a. Buatlah sketsa lintasan benda!

b. Berapakah besar kecepatan benda pada saat  $t = 2 \text{ s}$ ?

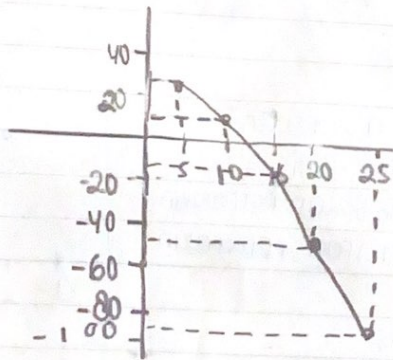
c. Hitunglah vektor kecepatan benda pada saat mencapai  $h = 2,0 \text{ m}$  dari tanah!

Jawab:  $r(t) = \underbrace{(5t\hat{i})}_x + \underbrace{(31,25 - 5t^2)\hat{j}}_y \text{ m}$

$$x = 5t$$

$$y = (31,25 - 5t^2)$$

t	x	y
1	5	26,25
2	10	11,25
3	15	-4,75
4	20	-20,75
5	25	-36,75



④  $t = 2 \text{ s}$

$$r(t) = (5t\hat{i} + (31,25 - 5t^2)\hat{j}) \text{ m}$$

$$v = \frac{dr}{dt}$$

$$= \frac{d}{dt} (u_0 + \int a dt)$$

$$= \frac{d}{dt} (u_0 + \int a dt)$$

$$v = \frac{d}{dt} \{5t\hat{i} + (31,25 - 5t^2)\hat{j}\}$$

$$= (5\hat{i} - 10t\hat{j})$$

$$= t = 2 \text{ s}$$

$$= (5\hat{i} - 10(2)\hat{j}) = 5\hat{i} - 20\hat{j} \text{ m/s}$$

$$|v| = \sqrt{5^2 + (20)^2}$$

$$= \sqrt{25 + 400}$$

$$= \sqrt{425} = \sqrt{25 \times 17}$$

$$= 5\sqrt{17} \text{ m/s}$$

⑤  $h = 2,0 \text{ m}$

$$y(t) = (31,25 - 5t^2)\hat{j}$$

$$2,0 = (31,25 - 5t^2)\hat{j}$$

$$5t^2 = (31,25)\hat{j} - 2,0$$

$$5t^2 = 29,25\hat{j}$$

$$t^2 = \frac{29,25}{5}\hat{j}$$

$$t^2 = 5,85\hat{j}$$

$$t = \sqrt{5,85}\hat{j}$$

$$= 2,41860 \text{ s} \approx 2,42 \text{ s}$$

vektor kecepatan?

$$v(t) = (5\hat{i} + (-10t)\hat{j}) \text{ m}$$

$$v(2,418) = (5\hat{i} + (-10(2,418)\hat{j}) \text{ m}$$

$$= 5\hat{i} + (-24,18)\hat{j} \text{ m}$$

$$v(2,418) = 5\hat{i} - 24,2\hat{j} \text{ m}$$



4) Dalam notasi vektor,

$$a = 14,0 \text{ m} \hat{i} + (3,0 \text{ m}) \hat{j}$$

$$b = (-13,0 \text{ m}) \hat{i} + (7,0 \text{ m}) \hat{j}$$

a. Berapakah  $a+b$ ?

b. Tentukan besaran  $a+b$ !

c. Tentukan arah  $a+b$ !

Jawab:  $a+b$

$$= 14,0 \text{ m} + (-13,0 \text{ m}) \hat{i} +$$

$$(3,0 \text{ m} + 7,0 \text{ m}) \hat{j}$$

$$= (9,0 \text{ m}) \hat{i} + (10,0 \text{ m}) \hat{j}$$

$$b) |a+b| = \sqrt{(-9,0 \text{ m})^2 + (10,0 \text{ m})^2}$$

$$= \sqrt{81 \text{ m}^2 + 100 \text{ m}^2}$$

$$= \sqrt{181} \approx 13,45 \text{ m}$$

c) arah  $a+b$ ?

$$\theta = \tan^{-1} \left( \frac{10,0}{-9} \right)$$

$$\approx 48,0^\circ$$

$$\text{jarak arah} = 180^\circ - 48^\circ$$

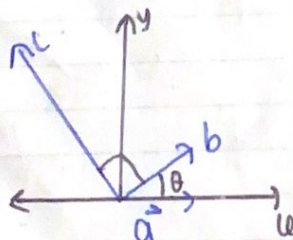
$$= 132^\circ \text{ terhadap sumbu } x$$

$$5) a = 3,00 \text{ m}$$

$$b = 4,00 \text{ m}$$

$$c = 10,00 \text{ m}$$

$$\theta = 30^\circ$$



a. komponen  $x$  dan  $y$  dari  $a$

b. komponen  $x$  dan  $y$  dari  $b$

c. komponen  $x$  dan  $y$  dari  $c$

d. jika  $\vec{c} = p\vec{a} + q\vec{b}$

Tentukan nilai  $p$  &  $q$ !

Jawab:  $c \perp b \theta = 90^\circ$

$$\vec{a} = a \hat{i}$$

$$\vec{b} = b \cos \theta \hat{i} + b \sin \theta \hat{j} \Leftrightarrow \vec{b} = b \cos \theta \hat{i} + b \sin \theta \hat{j}$$

$$\vec{c} = c \cos \theta \hat{i} + c \sin \theta \hat{j}$$

$$\Leftrightarrow \vec{c} = c \cos(\theta + 90^\circ) \hat{i} + c \sin(\theta + 90^\circ) \hat{j}$$

a) komponen  $x$  dari  $a$ ?

$$\vec{a} = a \hat{i}$$

$$= a \cos 0^\circ$$

$$= a \cdot 1 = a \Leftrightarrow 3 \text{ m}$$

b) komponen  $y$  dari  $b$ ?

$$\vec{b} = b \cos \theta \hat{i} + b \sin \theta \hat{j}$$

$$= 4 \cos 30^\circ = 4 \cdot \frac{1}{2} \sqrt{3}$$

$$= 2\sqrt{3} \text{ m}$$

$$\rightarrow b \sin \theta \hat{j}$$

$$= 4 \sin 30^\circ = 4 \cdot \frac{1}{2} = 2 \text{ m}$$

c) komponen  $x$  dari  $c$ ?

$$\vec{c} = c \cos \theta \hat{i} + c \sin \theta \hat{j}$$

$$= c \cos(\theta + 90^\circ) \hat{i}$$

$$= 10 \cdot \cos(30 + 90) \hat{i}$$

$$= 10 \cdot \cos 120^\circ \hat{i}$$

$$= -5 \text{ m}$$

$$= c \sin \theta \hat{j} = c \sin(\theta + 90^\circ) \hat{j}$$

$$= 10 \cdot \sin 120^\circ \hat{j}$$

$$= 8,66 \text{ m}$$

d)  $\vec{c} = p\vec{a} + q\vec{b}$

$p$  &  $q$ ?

$$\Leftrightarrow \vec{c} = (c \cos \theta \hat{i} + c \sin \theta \hat{j})$$

$$= p(a \hat{i}) + q(b \cos \theta \hat{i} + b \sin \theta \hat{j})$$

$$c = p(a \cos \theta) + q(b \cos \theta)$$

$$\vec{c} = c \cos \theta \hat{i} + c \sin \theta \hat{j}$$

$$= p(a u \hat{i}) + q(b u \hat{i} + b y \hat{j})$$

$$\vec{c} = (pau + qbu) \hat{i} + (qby) \hat{j}$$

$$c_x = pau + qbu \hat{i};$$

$$c_y = qby \hat{j}$$

Substitusi

$$-5m = p(3m) + q(2\sqrt{3}) \hat{i};$$

$$0,66 = 2q$$

$$q = 4,33$$

$$-5m = 3p + 2\sqrt{3}(4,33)$$

$$-3p = 5 + 2\sqrt{3}(4,33)$$

$$p = \frac{5 + 2\sqrt{3}(4,33)}{-3}$$

$$-3$$

$$= -6,66 \approx -6,67$$

$$⑥ \vec{d}_1 = -3\hat{i} + 3\hat{j} + 2\hat{k}$$

$$\vec{d}_2 = -2\hat{i} - 4\hat{j} + 2,0\hat{k}$$

$$\vec{d}_3 = 2\hat{i} + 3\hat{j} + 1\hat{k}$$

Tentukan

$$a. \vec{d}_1 (\vec{d}_2 + \vec{d}_3)$$

$$b. \vec{d}_1 (\vec{d}_2 \times \vec{d}_3)$$

$$c. \vec{d}_1 \times (\vec{d}_2 + \vec{d}_3)$$

$$\text{Jawab: } a) \vec{d}_1 (\vec{d}_2 + \vec{d}_3)$$

$$= (-3\hat{i} + 3\hat{j} + 2\hat{k})((-2\hat{i} - 4\hat{j} + 2\hat{k}) + (2\hat{i} + 3\hat{j} + 1\hat{k}))$$

$$= \vec{d}_1 + \vec{d}_3$$

$$= (-1\hat{i} + 3\hat{k}) \cdot (-3\hat{i} + 3\hat{j} + 2\hat{k})$$

$$= -3 + 6\hat{k}$$

$$= -3 + 6 = 3$$

$$b) \vec{d}_1 (\vec{d}_2 \times \vec{d}_3)$$

$$= -3\hat{i} + 3\hat{j} + 2\hat{k} (-2\hat{i} - 4\hat{j} + 2\hat{k}) \times (2\hat{i} + 3\hat{j} + 1\hat{k})$$

$$= \vec{d}_2 \times \vec{d}_3$$

$$= (-2\hat{i} - 4\hat{j} + 2\hat{k}) \times (2\hat{i} + 3\hat{j} + 1\hat{k})$$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -2 & -4 & 2 \\ 2 & 3 & 1 \end{vmatrix}$$

$$= -4\hat{i} - 6\hat{j} - 10\hat{k} \parallel -2\hat{i} - 4\hat{j} - 6\hat{k} \parallel -6\hat{i} + 8\hat{j} + 2\hat{k}$$

$$(-10\hat{i} + 6\hat{j} + 2\hat{k})(3\hat{i} + 3\hat{j} + 2\hat{k})$$

$$= (30\hat{i} + 18\hat{j} + 4\hat{k})$$

$$= (30 + 18 + 4) = 52$$

$$c) \vec{d}_1 \times (\vec{d}_2 + \vec{d}_3)$$

$$= (-3\hat{i} + 3\hat{j} + 2\hat{k}) \times (-1\hat{i} + 3\hat{j} + 3\hat{k})$$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -3 & 3 & 2 \\ 0 & -1 & 3 \end{vmatrix}$$

$$(11\hat{i} + 9\hat{j} + 14\hat{k})$$

$$9 + 2 \parallel -9 \parallel 3$$

$$\parallel 11\hat{i} - 9\hat{j} + 3\hat{k} \parallel$$

$$\boxed{\begin{matrix} \vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A} \\ \vec{A} \cdot \vec{A} = |\vec{A}|^2 \\ \vec{A} \cdot \vec{B} = 0 \end{matrix}}$$



7) Bola mengg ing

$$h_1 = 1,20 \text{ m}$$

$$s_1 = 1,52 \text{ m (jauh) (horizontal)}$$

(a) Berapa lama bola berada di lantai?

(b) Berapa kecepatan bola tersebut saat tepat jatuh?

Jawab: (a) gab: 
$$h = \frac{1}{2} g t^2$$

$$1,20 = \frac{1}{2} \cdot 10 \cdot t^2$$

$$t^2 = \frac{1}{2} \cdot 10^5$$

$$= \frac{1,20}{5}$$

$$t^2 = 0,24 \Leftrightarrow \sqrt{0,24} = 0,498$$

(b) 
$$v_{\text{bola}} = \frac{s}{t}$$

$$= \frac{1,52 \text{ m}}{0,498} = 3,102 \text{ m/s}$$

kec. horizontal

$$v_y = g \cdot t$$

kec. vertikal

$$= 10 \cdot 0,498 = 4,98 \text{ m/s}$$

$$v = \sqrt{(3,102)^2 + (4,98)^2}$$

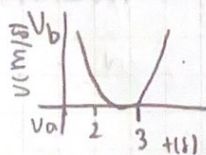
kec. total

$$= 5,99 \text{ m/s}$$

8)  $t=0$

$$v_a = 19 \text{ m/s}$$

$$v_b = 31 \text{ m/s}$$



a) jarak yang ditempuh horizontal sebelum kembali ke permukaan tanah!

b) hmax diatas tanah dicapai

Jawab: Jarak horizontal =  $v_{11} \times t$

$$31 \text{ m/s} \times 5 \text{ s}$$

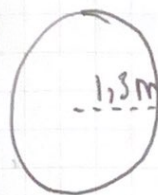
$$155 \text{ m}$$

b) 
$$h_{\text{max}} = v_{10} \times t_{\text{max}} - \frac{1}{2} g t_{\text{max}}^2$$

$$= 19 \times 2,5 - \frac{1}{2} \cdot 10 \cdot (2,5)^2$$

$$= 16,25 \text{ m}$$

9)



2,0 m

$v_{\text{tali}} = 10 \text{ m (horizontal)}$

Dit: Besar sentripetal batu saat melingkar?

Jawab: a) waktu yang diperlukan batu jatuh ke tanah

$$h = \frac{1}{2} g t^2$$

$$2,0 = \frac{1}{2} (10) t^2$$

$$t^2 = \frac{2,0}{5}$$

$$t = \sqrt{\frac{2,0}{5}} = \frac{\sqrt{10}}{5} = 0,632$$

kec. horizontal batu!

$$v_{11} = \frac{v}{t}$$

$$= \frac{10}{0,632} = 15,82 \text{ m/s}$$

$$a_s = \frac{v^2}{r} = \frac{(15,82)^2 \text{ m/s}}{1,3 \text{ m}} = 150,9$$

10) Dik:  $m = 8,5 \text{ kg}$

$\theta = 30^\circ$



- Dit: a) Besar tegangan tali  
b) gaya normal  
c) gaya tali putuif, percepatan balok?

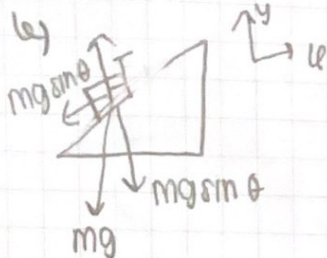
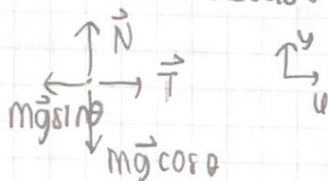


Diagram benda bebas:



$\sum F_x = 0$

$\sum F_y = 0$

$T - mg \sin \theta = 0$

$N - mg \cos \theta$

a) Besar tegangan tali!

$\sum F_x = 0 \rightarrow T - mg \sin \theta = 0$

$$\begin{aligned} T &= mg \sin \theta \\ &= (8,5)(10) \sin 30^\circ \\ &= 8,5 \cdot 10 \cdot \frac{1}{2} \\ &= 42,5 \text{ N} \end{aligned}$$

b) Besar  $F_N$ !

$\sum F_y = 0$

$N - mg \cos \theta = 0$

$N = mg \cos \theta$

$= 8,5 \cdot 10 \cdot \cos 30^\circ$

$= 73,61 \text{ N}$

c) Balok meluncur kebawah, dan

Percepatan  $a$

$\sum F_u = m \cdot a$

$-mg \sin \theta = m \cdot a$

$a = -g \sin \theta$

$= -10 \sin 30^\circ$

$= -10 \cdot \frac{1}{2} = -5 \text{ m/s}^2$

$\downarrow$   
-u / turun  
kebawah

$|a| = 5 \text{ m/s}^2$  (besar percepatan)

11) Dik:  $m = 2 \text{ kg}$

$F_1 = 20 \text{ N}$

$a = 12 \text{ m/s}^2$

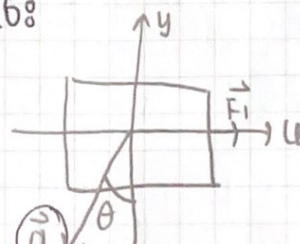
$\theta = 30^\circ$

Dit: a) gaya kedua dalam notasi vektor

b) gaya kedua

c) sudut relative terhadap sumbu x

Jawab:



$\sum F_u = m \cdot a$

$\vec{F}_1 + \vec{F}_2 = m \cdot \vec{a}$

$\vec{F}_2 = m \cdot \vec{a} - \vec{F}_1$

$a$ : kw3 then  $F_2$  berada pada kw3 (atrumen)

11)



a) Dalam notasi vektor,  $\vec{F}_1 = 20 \text{ N}$   
 $\vec{a} = (-12 \sin 30^\circ \hat{i}) -$   
 $(12 \cos 30^\circ \hat{j})$

$$\vec{a} = (-6\hat{i} - 10,4\hat{j}) \text{ m/s}^2$$

Sehingga  $\vec{F}_2 = m\vec{a} - \vec{F}_1$

$$\vec{F}_2 = (2)(-6\hat{i} - 10,4\hat{j}) - 20\hat{i}$$

$$\vec{F}_2 = -32 \text{ N}\hat{i} - 20,8 \text{ N}\hat{j}$$

b) besar gaya kedua:

$$|\vec{F}_2| = \sqrt{(-32)^2 + (-20,8)^2}$$

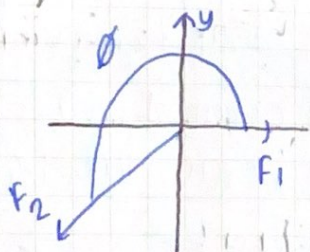
$$= 38,2 \text{ N}$$

$$c) \tan \phi = \left( \frac{F_{2y}}{F_{2x}} \right) = \frac{-20,8 \text{ N}}{-32 \text{ N}}$$

$$= 0,656$$

$$\phi = 33^\circ \text{ atau } 33^\circ + 180^\circ = 213^\circ$$

$$\therefore \phi = 213^\circ$$



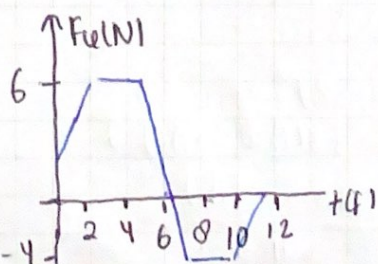
1a) Dik:  $m_1 = 3 \text{ kg}$

$$t = 0$$

$$v = 3 \text{ m/s}$$

$$\text{Dit: } t = 7 \text{ s} = 11 \text{ s}$$

b) arah gerak balok?



jawab: a)  $I = \Delta p$   
 $= m \Delta v$

$$L_1 = \frac{1}{2} (6+6) \times 5 = 30 \text{ N}\cdot\text{s}$$

$$\# t = 5 - 8$$

$$L_2 = \frac{1}{2} (6 + (-4)) \times 3$$

$$= \frac{1}{2} \times 2 \times 3 = 3 \text{ N}\cdot\text{s}$$

$$\# t = 8 - 10$$

$$L_3 = \frac{1}{2} (-4) \times 2 = -4 \text{ N}\cdot\text{s}$$

$$\# t = 10 - 11$$

$$L_4 = (-4) \times 1 = -4 \text{ N}\cdot\text{s}$$

$$\text{Tot: } I = 30 + 3 - 4 - 4 = 25 \text{ N}\cdot\text{s}$$

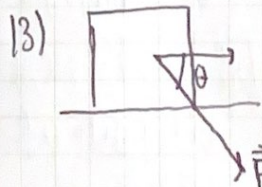
$$I = m \Delta v$$

$$25 = 3,0 (v - 3)$$

$$v = 3,0 = \frac{25}{3} \approx 8,33$$

$$v = 8,33 + 3,0 = 11,33 \text{ m/s}$$

b) arahnya ke sb. k (+)



Dik:  $m = 3,5 \text{ kg}$

$$F = 15 \text{ N}$$

$$\theta = 40^\circ$$

$$\text{Koeff gesek} = 0,25$$

Dit:

a) Besar gaya gesek !

b) porc-balok ?

$$f_s = \mu_k \times N$$

$$N = mg - f_s \sin \theta$$

$$N = (3,5 \times 10) - (15 \times \sin 40^\circ)$$

$$= 25,35 \text{ N}$$

$$f_k = \mu_k \times N$$

$$= 0,25 \times 25,35 \text{ N}$$

$$= 6,337 \text{ N}$$

$$b) f_u = f \cos \theta$$

$$f_u = 15 \times \cos 40^\circ$$

$$= 15 \times 0,766 = 11,49 \text{ N}$$

$$f_{tot} = f_u - f_k$$

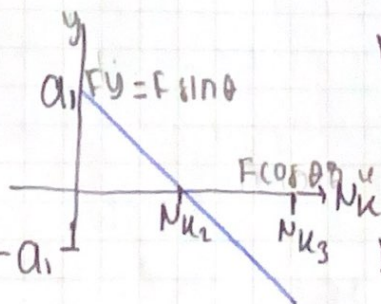
$$= 11,49 - 6,337 = 5,153 \text{ N}$$

$$F = m \cdot a$$

$$a = \frac{f_{tot}}{m} = \frac{5,153 \text{ N}}{3,5}$$

$$= 1,472 \text{ m/s}^2$$

14)



$$\text{Dik: } a_1 = 3 \text{ m/s}^2$$

$$\mu_k = 0,2$$

$$\mu_k = 0,4$$

$$\text{dit: } \text{maka } \theta?$$

$$N = mg - f \sin \theta$$

$$f_k = \mu_k N$$

$$= \mu_k (mg - f \sin \theta)$$

$$f \cos \theta - \mu_k (mg - f \sin \theta) = m a$$

$$\text{maka } m = 1 \text{ kg:}$$

$$f \cos \theta - 0,2 (1 \times 10 - f \sin \theta) = 1 \times 3$$

$$f \cos \theta - 0,2 (10 - f \sin \theta) = 3$$

$$f (\cos \theta + 0,2 \sin \theta) = 3$$

$$f (\cos \theta + 0,2) = 5 \text{ N}$$

$$5 (\cos \theta + 0,2) = 5$$

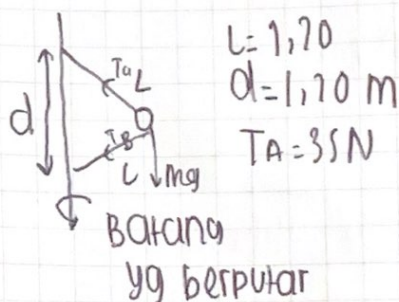
$$\cos \theta + 0,2 = 1$$

$$\cos \theta = 0,8$$

$$\theta = \cos^{-1}(0,8)$$

$$= 36,87^\circ$$

15)



$$\text{Dit: a) besar } T_B \text{ (bawah)?}$$

$$b) \text{ besar } F_{net}?$$

$$c) \text{ besar } \text{kec. bola?}$$

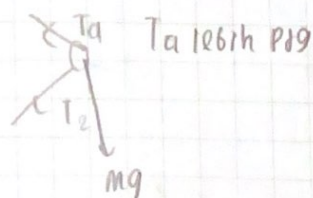
$$d) F_{net}?$$

$$\text{Jawab: a) } \Sigma F = 0$$

$$T \sin \theta - T \sin \theta - mg = 0$$

$$\Sigma F = m \cdot a$$

$$T_1 \cos \theta - T \cos \theta - mg = m \cdot a$$

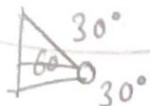


$$T_1 \sin \theta - T \sin \theta - mg = 0$$

$$T_2 = \frac{T_1 \sin \theta - mg}{\sin \theta}$$

$$= 0$$





$$\begin{aligned}
 T_2 &= \frac{T_1 \sin \theta - mg}{\sin \theta} \\
 &= \frac{35 \sin 30^\circ - 1,34 \cdot 10}{\sin 30} \\
 &= \frac{35 \cdot 0,5 - 1,34 \cdot 10}{0,5} \\
 &= 35 - 13,4 \\
 &= 21,6 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } |F_{\text{net}}| &= |T_2 \cos \theta + T_1 \cos \theta| \\
 &= |21,6 \cdot \cos 30 + 35 \cos 30| \\
 &= |21,6 \cdot \frac{1}{2} \sqrt{3} + 35 \frac{1}{2} \sqrt{3}| \\
 &= 0,130
 \end{aligned}$$

c) laju bola?

$$\begin{aligned}
 \frac{d}{2R} &= \frac{d}{2 \tan 30} \\
 &= \frac{10^{\text{m}}}{2 \sqrt{3}} = 2,886 \text{ m}
 \end{aligned}$$

d) arah?

ke sumbu u negatif