1) a.

a_x (m/s²) graph with axes, values -3 marked, points at 8 and 12 on the $t(s)$ axis.

c. $\vec{r}(12) = \vec{r}(0) + (48\hat{\imath} + 36\hat{\jmath}) = 50\hat{\imath} + 30\hat{\jmath}$

d. $\dfrac{\vec{r}(12) - \vec{r}(0)}{12 - 0}$

$= \dfrac{48\hat{\imath} + 36\hat{\jmath}}{12}$

$= 4\hat{\imath} + 3\hat{\jmath}$

b. • Luas total: $\dfrac{8+10}{2} \cdot 6 - \dfrac{1}{2} \cdot 2 \cdot 6$

$= 54 - 6$

$= 48$ m

• Sb -y :

$y = \int_0^{12} (-0{,}5t + 6)\, dt$

$= -\dfrac{t^2}{4} + 6t \Big|_0^{12}$

$= -36 + 72$

$= 36$ m

∴ Perpindahan : $\vec{r}(12) - \vec{r}(0)$

$= 48\hat{\imath} + 36\hat{\jmath}$

2) a. • $w = \sqrt{\dfrac{k}{m}} = \sqrt{\dfrac{100\pi^2}{1}} = 10\pi$

$\Rightarrow x(t) = A \cos(10\pi t + \phi)$

$\Rightarrow v(t) = -A \sin(10\pi t + \phi)(10\pi)$

Saat $t = 0$,

$0{,}032 = A \cos\phi$ dan $-0{,}24\pi = -10A\pi \sin\phi$

$0{,}024 = A \sin\phi$

Diperoleh,

$0{,}032^2 + 0{,}024^2 = A^2$

$A^2 = 0{,}0016$

$A = 0{,}04$ m

dan

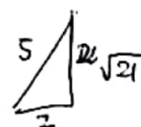$\sin\phi = \dfrac{0{,}024}{0{,}04} = \dfrac{3}{5}$

$\phi = 37° \left(\dfrac{37}{180}\pi \text{ radian}\right)$

b. $x(t) = 0{,}04 \cos\left(10\pi t + \dfrac{37}{180}\pi\right)$

c. $v(t) = -0{,}4\pi \sin\left(10\pi t + \dfrac{37}{180}\pi\right)$

saat simpangan $-0{,}016$ m $\Rightarrow \cos\left(10\pi t + \dfrac{37}{180}\pi\right) = -0{,}4$

$\Rightarrow v = -0{,}4\pi \cdot \dfrac{\sqrt{21}}{5} = -0{,}02\pi\sqrt{21}$ m/s

triangle with sides 5, $\sqrt{21}$, 2

3)

~~Benda 1~~

a. • gaya $= |mg \sin 37^0 - mg \sin 53^0| = |10(10)\cdot\frac{3}{5} - 15(10)\frac{4}{5}| = |60 - \cancel{120}| = 60_N$

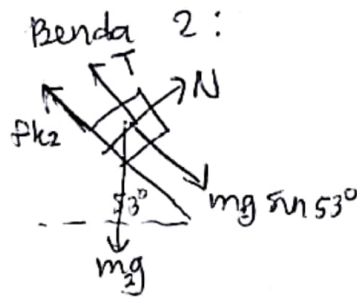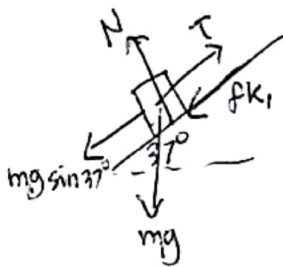• gaya gesek statik benda 1 : $\mu_s\, m_1 g \cos 37^0 = 0{,}3 \cdot 10 \cdot 10 \cdot \frac{4}{5} = 24\ N$
  maksimum

• gaya gesek statik benda 2 : $\mu_s\, m_2 g \cos 53^0 = 0{,}3 \cdot 15 \cdot 10 \cdot \frac{3}{5} = 27\ N$
  maksimum

karena gaya lebih besar maka benda akan ~~akan~~ bergerak
dimana benda 1 akan naik dan benda 2 akan turun.

b. Benda 1 :

Benda 2 :

$\Sigma F = \cancel{(m_1+m_2)a} \cancel{\Longrightarrow}\ T - m_1 g \sin 37^0 - fk_1 - T - fk_2 + mg \sin 53^0$

$= -10 \cdot 10 \cdot \frac{3}{5} + \cancel{15} 15 \cdot 10 \cdot \frac{4}{5} - \mu_k \cdot m_1 g \cos 37^0 - \mu_k\, m_2 g \cos 53^0$

$= 60 - 0{,}2 \left(10 \cdot 10 \cdot \frac{4}{5} + 15 \cdot 10 \cdot \frac{3}{5}\right)$

$= 60 - 0{,}2\,(80 + 90)$

$= 60 - \cancel{24}\ 34$

$= 26\ N$

c. $\Sigma F = (m_1 + m_2)a$

$26 = 35\,a$

$a = \frac{26}{35}\ m/s^2$

$\Rightarrow T - m_1 g \sin 37^0 - fk_1 = m_1 a$

$T - 60 - 16 = 10 \cdot \frac{26}{35}$

$T - 76 = \frac{260}{35}$

$T = 76 + \frac{260}{35} = 83{,}43\ N$

‘• •

4) a. $\Delta Ek + \Delta EP = W_{gesek}$

$\quad \frac{1}{2}mv^2 + mg \cdot 4 \sin\theta = -\mu_k \cdot mg \cos\theta$

$\quad \frac{1}{2}v^2 = 4g \sin\theta - 0,2g \cos\theta$

$\quad v^2 = 8g \sin\theta - 0,4g \cos\theta$

$\quad v^2 = 80 \sin\theta - 4 \cos\theta$

$\quad v = \sqrt{80 \sin\theta - 4 \cos\theta} \quad m/s$

b. $F = k \cdot \Delta x$

$\quad mg \sin\theta = 200 \cdot \Delta x$

$\quad 0,5 \cdot 10 \cdot \sin\theta = 200 \Delta x$

$\quad \Delta x = \dfrac{\sin\theta}{40} \quad m$

c. $Ep = \frac{1}{2}k \cdot \Delta x^2 = \frac{1}{2} 200 \cdot \dfrac{\sin^2\theta}{40^2} = \dfrac{\sin^2\theta}{16}$

$\quad * - Ep = W = -mg \sin\theta \cdot d$

$\quad \dfrac{\sin^2\theta}{16} = mg \sin\theta \cdot d$

$\quad \dfrac{\sin^2\theta}{16} = 0,5 \cdot 10 \cdot \sin\theta \cdot d$

$\quad d = \dfrac{\sin\theta}{80} \quad m$

5) a. $Ek_1 + EP_1 = Ek_2 + EP_2$

$\quad 0 + m g (R \, \text{su} \cos\theta) = \frac{1}{2}m_1 v^2 + 0$

$\quad Rg \cos\theta = \frac{1}{2}v^2$

$\quad v^2 = 2g R \cos\theta = 2 \cdot 10 \cdot 1,2 \cos 37°$

$\quad v^2 = \dfrac{96}{5}$

$\quad v = 4,38 \quad m/s$

b. $T = m_2 g = 60$

$\quad m_1 g \cos\theta = 60$

$\quad 30 \cos\theta = 60$

$\quad \cos\theta = 2 \Rightarrow$ tidak akan terangkat