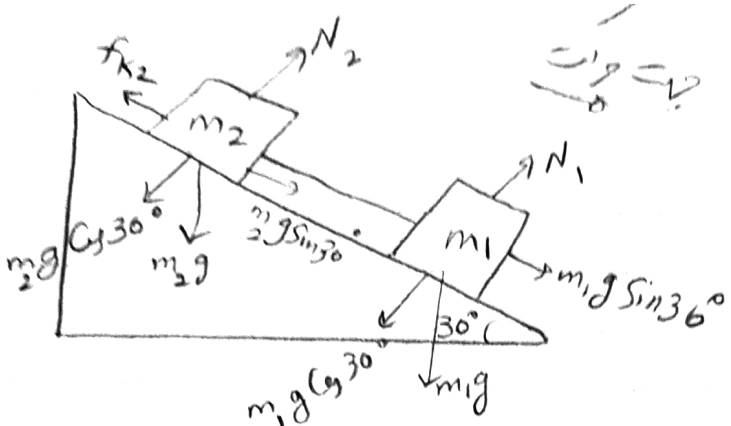


$R=?$ (1)

$m_1 = m_2 = 2kg$

سطح شیب‌دار بدون اصطکاک $\rightarrow a = 0 \ m/s^2$

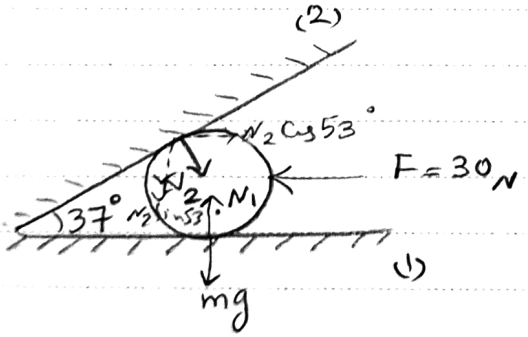
$\Sigma F = ma$

$\rightarrow m_1g\sin30° + m_2g\sin30° - f_{K_2} = 0$

جسم ۱ و ۲ $\rightarrow (2kg+2kg)\times 9.8_{(m/s^2)} \times \sin30° - f_{K_2} = 0 \rightarrow f_{K_2} = 19.6_N$

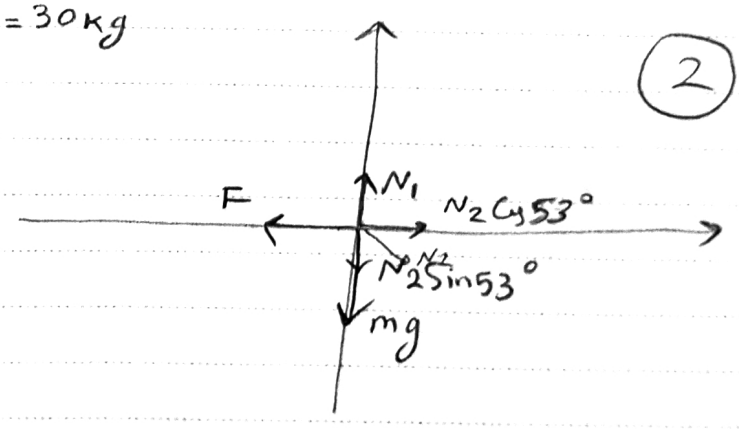
(2) جسم ۲: $\Sigma F_y = 0 \rightarrow N_2 = m_2g\cos30° \rightarrow N_2 = 2\times9.8\times\frac{\sqrt{3}}{2} \cong 16.97_N$

$R = \sqrt{N^2 + f_{K_2}^2} = \sqrt{(16.97)^2 + (19.6)^2} \cong 25.93_N$



$m = 30kg$

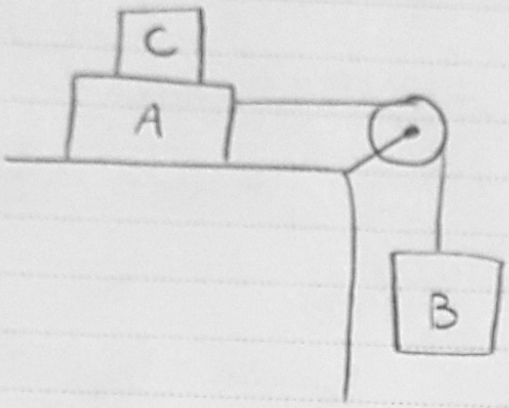
(2)



$\begin{cases} \sin37° = 0.6 \\ \cos37° = 0.8 \end{cases}$

$\Sigma F_x = 0 \rightarrow N_2\cos53° = F \rightarrow N_2\times0.6 = 30 \rightarrow N_2 = 50_N$

$\Sigma F_y = 0 \rightarrow N_1 = N_2\sin53° + mg \rightarrow N_1 = 50\times0.8 + 30\times9.8 = 334_N$



$m_A g = 44_N$

$m_B g = 22_N$ ، $\mu_s = 0.3$

(3)

الف) نلغزد $\rightarrow \Sigma F = 0 \rightarrow m_B g = \mu_s (m_A g + m_C g)$

$\rightarrow m_B g = \mu_s m_A g + \mu_s m_C g \rightarrow m_C g = \frac{m_B g - \mu_s m_A g}{\mu_s}$

$\rightarrow m_C g = \frac{22 - 0.3 \times 44}{\mu_s} \simeq 29.33$

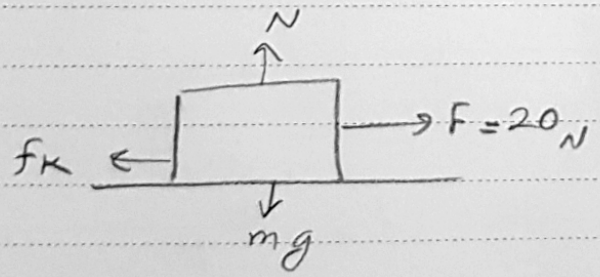
ب) $m_B g - f_K = (m_A + m_B) a$

$\rightarrow m_B g - \mu_K \cdot m_A g = (m_A + m_B) a$

$\rightarrow a = \frac{m_B g - \mu_K m_A g}{m_A + m_B} = \frac{22 - 0.2(44)}{\frac{22+44}{9.8}} = 1.96 \, m/s^2$

---

(4)



$\Sigma F = ma$

$F - f_K = ma$

$20 - \mu_K \cdot mg = ma$

$20 - 0.3(4 \times 9.8) = 4a$

$\rightarrow a = \frac{20 - 0.3(9.8 \times 4)}{4} \simeq 2.06 \, m/s^2$

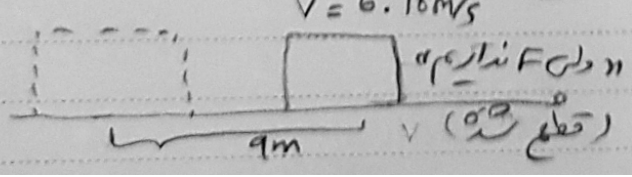
$V_0 = 0 \, m/s$

وقتی $t = 3$

$V = at + V_0 \rightarrow V = 3 \times 2.06 = 6.18 \, m/s$

$x = \frac{1}{2} a t^2 + V_0 t + x_0 = \frac{1}{2}(2.06)(3)^2 = 9.27 \, m$

تا اینجا نخ دره نشده.



$$x_{stop} = \frac{v_0^2}{2\mu k g} = \frac{36}{2 \times 0.3 \times 9.8} = 6.12\,m$$

$$\therefore x = 9.27 + 6.12 = 15.39\,m$$