<8.3~4절>

8.6 m = 27 kg, μ_s = 0.25, θ = 30°

W = (27 kg)(9.81 m/s^2) = 264.9 N

$\phi_s = \tan^{-1}\mu_s = \tan^{-1}(0.25) = 14.04°$

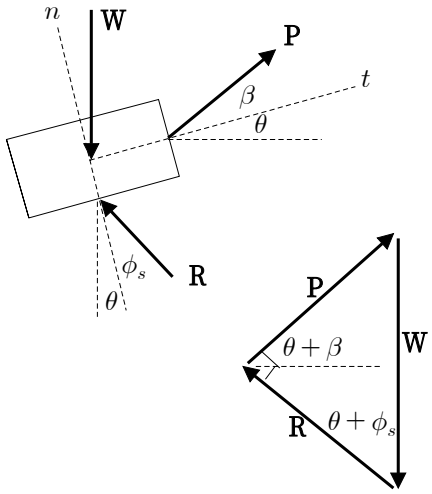
P가 최소이기 위하여 **P⊥R**

$\Rightarrow \quad \beta = \phi_s = 14.04°$

$P = W\sin(\theta + \phi_s)$

= (264.9 N) sin(30° +14.04°) = 184.13 N

$\Rightarrow \quad P_{\min}$ = 184.1 N

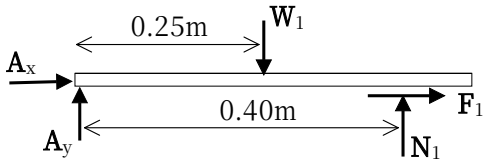


8.39 W_1 = (6 kg)(9.81 m/s^2) = 58.86 N

W_2 = (18 kg)(9.81 m/s^2) = 176.58 N

$2r$ = 0.25 m

μ_s = 0.35



rod AB 에서

$\circlearrowleft \Sigma M_A = 0$; (0.40 m)N_1 - (0.25 m)W_1 = 0

$\Rightarrow \quad N_1 = \dfrac{0.25\text{ m}}{0.40\text{ m}} W_1 = \dfrac{0.25\text{ m}}{0.40\text{ m}}$ (58.86 N)

= 36.79 N

cylinder C에서

$\rightarrow \Sigma F_x = 0$; $P - F_1 - F_2 = 0 \quad \Rightarrow \quad P = F_1 + F_2$

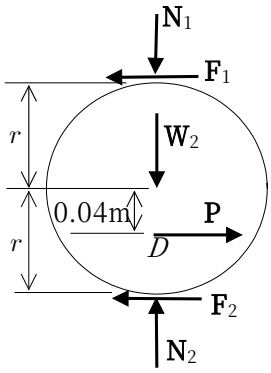
$\uparrow \Sigma F_y = 0$; $N_2 - N_1 - W_2 = 0$

$\Rightarrow \quad N_2 = N_1 + W_2$ = (36.79 N) + (176.58 N)

= 213.37 N

$\circlearrowleft \Sigma M_D = 0$; $(r + 0.04\text{ m})F_1 - (r - 0.04\text{ m})F_2 = 0$

$F_2 = \dfrac{r + 0.04\text{ m}}{r - 0.04\text{ m}} F_1 = \dfrac{0.125\text{ m} + 0.04\text{ m}}{0.125\text{ m} - 0.04\text{ m}} F_1 = 1.941\ F_1$



cylinder C의 아랫면에서 먼저 미끄러지려 할 때

$F_2 = \mu_s N_2$ = (0.35)(213.37 N) = 74.68 N

$F_1 = \dfrac{1}{1.941}$ (74.68 N) = 38.47 N

$F_{1\max} = \mu_s N_1$ = (0.35)(36.79 N) = 12.88 N $\quad \Rightarrow \quad F_1 > F_{1\max}$: 불가능

cylinder C의 윗면에서 먼저 미끄러지려 할 때

$F_1 = \mu_s N_1$ = (0.35)(36.79 N) = 12.88 N

F_2 = 1.941 (12.88 N) = 24.99 N

$F_{2\max} = \mu_s N_2$ = (0.35)(213.37 N) = 74.68 N $\quad \Rightarrow \quad F_2 < F_{2\max}$: 가능

P = (12.88 N) +(24.99 N) = 37.87 N

$\Rightarrow \quad P_{\max}$ = 37.9 N