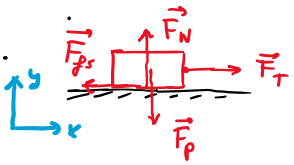
4.30 (a).



Imminence de glissement : $F_T = F_{fs}^{max} = \mu_s F_N = \mu_s F_p$

$\vec{a} = \vec{0}$, $\vec{v} = \vec{0}$

$= \mu_s m g$

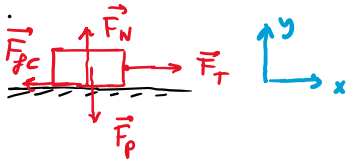
$= 0{,}76 \cdot 60 \cdot 9{,}81$

$= 4{,}5 \cdot 10^2$ N

2ème loi :

$$\begin{cases} \Sigma F_x = F_T - F_{fs}^{max} = 0 \\ \Sigma F_y = F_N - F_p = 0 \end{cases}$$

(b). glissement $\vec{v} = \text{constante}$



2ème loi :

$$\Sigma \vec{F} = \vec{F}_T + \vec{F}_{fc} + \vec{F}_N + \vec{F}_p = m\vec{a}$$

$$\begin{cases} \Sigma F_x = F_T - F_{fc} = 0 \\ \Sigma F_y = F_N - F_p = 0 \end{cases}$$

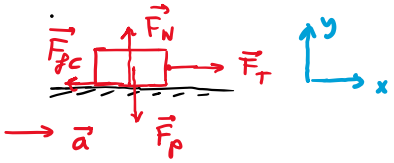
$F_T = F_{fc} = \mu_c F_N = \mu_c mg = 2{,}4 \cdot 10^2$ N

4.31

(a). Est-ce que $F_T = 36\,N > F_{fc}^{max}$? $\quad F_{fs}^{max} = \mu_s F_N = \mu_s mg = 0{,}65 \cdot 45 = 29\,N < F_T$

$\Rightarrow$ le bloc est accéléré !

(b).



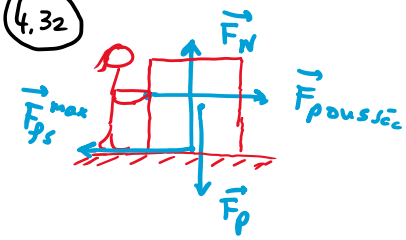
2ème loi : $\Sigma \vec{F} = \vec{F}_T + \vec{F}_{fc} + \vec{F}_N + \vec{F}_p = m\vec{a}$

$$\begin{cases} \Sigma F_x = F_T - F_{fc} = ma \quad (1) \\ \Sigma F_y = F_N - F_p = 0 \quad (2) \end{cases} \qquad F_{fc} = \mu_c F_N = \mu_c F_p \quad (3)$$

$$m = \frac{F_p}{g} \quad (4)$$

De (1) : $a = \frac{1}{m}(F_T - F_{fc}) = \frac{1}{m}(F_T - \mu_c F_p) = \frac{g}{F_p}(F_T - \mu_c F_p) \simeq 3{,}7\ m/s^2$

4.32



2ème loi : $\Sigma \vec{F} = \vec{F}_{fs}^{max} + \vec{F}_{pous} + \vec{F}_N + \vec{F}_p = \vec{0}$

$$\begin{cases} \Sigma F_x = F_{poussée} - F_{fs}^{max} = 0 \quad (1) \\ \Sigma F_y = F_N - F_p = 0 \quad (2) \end{cases}$$

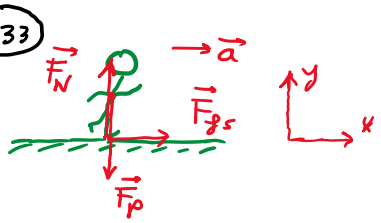
$\vec{v} = \vec{0} \Rightarrow F_{fs}^{max}$!

$F_{fs}^{max} \geq \mu_s F_N \quad (3)$

$\Rightarrow \quad F_{fs}^{max} \geq \mu_s F_N = \mu_s mg = F_{poussée}$

$\Rightarrow \mu_s \geq \frac{F_{poussée}}{m \cdot g} = \frac{300}{1000} = 0{,}3$

4.33



$F_{fc} = \mu_s F_N$

(a). 2ème loi : $\Sigma \vec{F} = \vec{F}_N + \vec{F}_p + \vec{F}_{fs} = m\vec{a}$

$$\begin{cases} \Sigma F_x = F_{fs} = ma \\ \Sigma F_y = F_N - F_p = 0 \end{cases} \Rightarrow a = \frac{1}{m} F_{fc} = \frac{1}{m} \mu_s mg = g \cdot \mu_s$$

$= 1{,}6\ m/s^2$

(b). a ne dépend pas de m ! $\quad a = 1{,}6\ m/s^2$