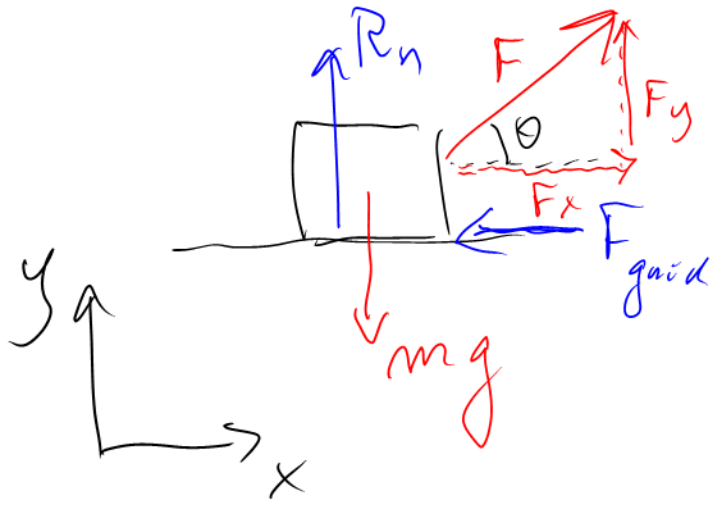


A5 & A6 – Fysik B: 17. marts 2015

- Dagsorden
 - Tilstedeværelsesregistrering
 - Opsamling fra sidst:
 - evt. spørgsmål til opgaver 4/12-4/19
- Nyt stof:
 - Newtons 2. lov (side 40-41)
- Nye opgaver
 - 5/1-5/6 + 5/10



Ex $m = 50 \text{ kg}$ $\theta = 35^\circ$
 $\mu = 0,30$
 $F = 200 \text{ N}$

Utvad er $a_x = ?$
 Utvad med $a_y = ?$

$$F_x = F \cdot \cos\theta \quad F_y = F \cdot \sin\theta$$

$$F_{\text{gnid}} = \mu \cdot R_n$$

$$\sum F_y = 0 : R_n + F \cdot \sin\theta - mg = 0$$

$$R_n = mg - F \sin\theta = 50 \cdot 9,82 - 200 \cdot \sin 35^\circ$$

$$= 376,29 \text{ N}$$

$$F_{\text{gnid}} = 0,3 \cdot 376,29 \text{ N} = 112,88 \text{ N}$$

$$a_x = \frac{1}{m} \sum_{\text{alle}} F_x = \frac{1}{m} (F \cdot \cos\theta - F_{\text{gnid}})$$

$$= \frac{1}{50} (200 \cdot \cos 35^\circ - 112,88) = 1,019 \frac{\text{m}}{\text{s}^2}$$

$$[a] = \frac{\text{m}}{\text{s}^2}$$


$$\rightarrow \underline{\underline{a_x = 1,0 \frac{\text{m}}{\text{s}^2}}}$$

$$\rightarrow \sum_{\text{alle}} F_x = m \cdot a_x$$

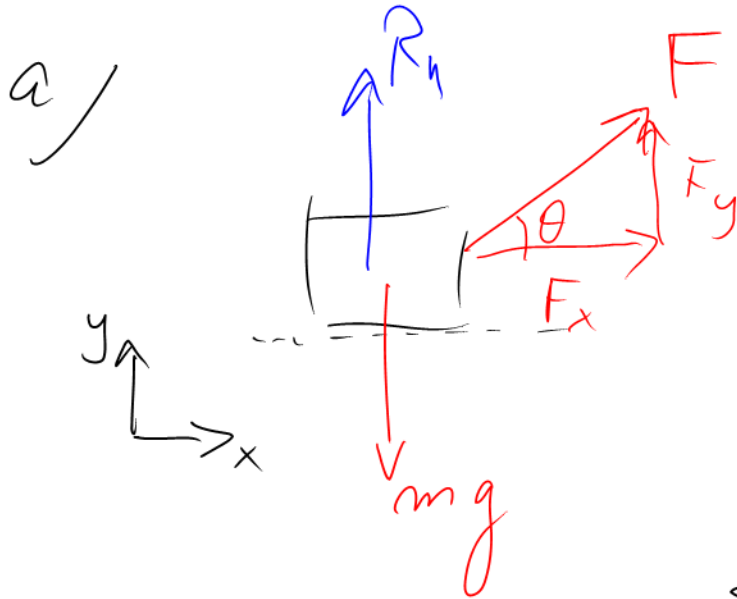
$$\uparrow \sum_{\text{alle}} F_y = m a_y$$

$$[V] = \frac{m}{s}$$

$$v = a \cdot t = 1,0 \frac{m}{s^2} \cdot 1s = 1,0 \frac{m}{s}$$


$$a_x = \frac{\sum F_x}{m} = \frac{F \cdot \cos \theta - F_{\text{quid}}}{m} = \frac{200 \cdot \cos 35^\circ - 112,88}{50} = 1,019 \frac{m}{s}$$

OPG 5/1



b)

$$\sum_{\text{alle}} F_x = m a_x : a_x = \frac{\sum F_x}{m} = \frac{F \cdot \cos \theta}{m} = \frac{90 \cdot \cos 30^\circ}{35} = 2,227 \frac{\text{m}}{\text{s}^2}$$

$$\rightarrow \underline{\underline{a = 2,2 \frac{\text{m}}{\text{s}^2}}}$$

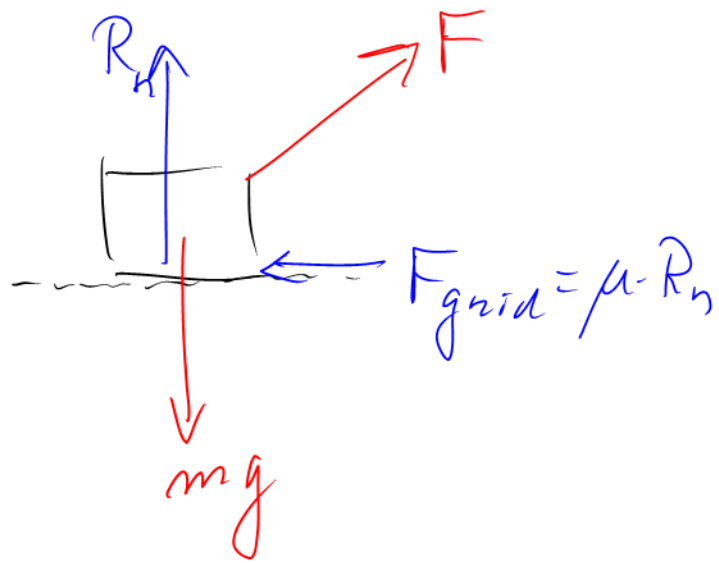
c)

$$\sum_{\text{alle}} F_y = 0 : R_n + F_y - mg = 0$$

$$R_n = mg - F \cdot \sin 30^\circ = 35 \cdot 9,82 - 90 \cdot \sin 30^\circ = 0,2987 \cdot 10^3 \text{ N}$$

$$\underline{\underline{\uparrow R_n = 0,30 \text{ kN}}}$$

OPG 5/2

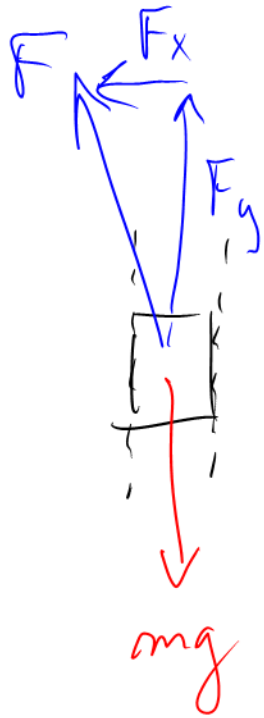


OBS

Se eksemplet
overfor opg 5/1



OPG 5/3



$$a) \uparrow \sum F_y = m \cdot a_y$$

alle F_y

$$F \cdot \cos \theta - mg = m \cdot a_y$$

$$F = \frac{m(g + a_y)}{\cos \theta}$$

$$a) a_y = 3,5 \frac{m}{s^2}$$

$$F = \frac{25 \cdot (9,82 + 3,5)}{\cos(30^\circ)} = 384,5 N$$

$$\uparrow F = \underline{\underline{0,38 kN}}$$

$$b) a_y = -3,5 \frac{m}{s^2}$$

$$F = \frac{25 \cdot (9,82 - 3,5)}{\cos(30^\circ)} = 182,4 N$$

$$\uparrow F = \underline{\underline{0,18 kN}}$$

OPG 5/4



$$a) \downarrow F_j = k \cdot \Delta L = 0,40 \frac{\text{kN}}{\text{m}} \cdot 0,50 \text{ m} = \underline{\underline{0,20 \text{ kN}}}$$

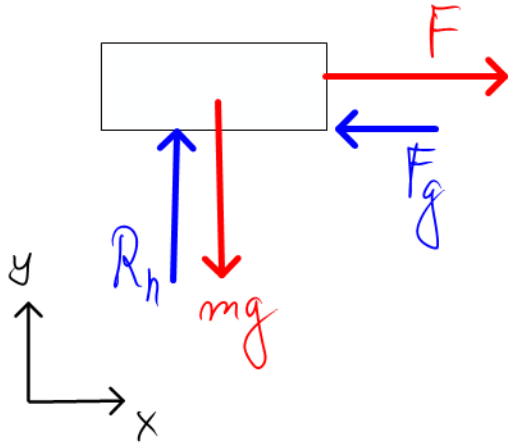
$$b) \uparrow m a_y = \sum_{\text{alle}} F_y$$

$$a_y = \frac{1}{m} \sum_{\text{alle}} F_y = \frac{1}{m} (F \cdot \cos \theta - mg - F_j)$$

$$a_y = \frac{1}{35 \text{ kg}} (0,42 \cdot 10^3 \text{ N} \cdot \cos(30^\circ) - 35 \text{ kg} \cdot 9,82 \frac{\text{m}}{\text{s}^2} - 0,20 \cdot 10^3 \text{ N})$$

$$\underline{\underline{\downarrow a = 5,1 \frac{\text{m}}{\text{s}^2}}}$$

OPG 5/6



$$a) \uparrow \sum F_y = 0 : R_n - mg = 0 \quad R_n = mg$$

$$F_{g \max} = \mu R_n = 0,30 \cdot 95 \text{ kg} \cdot 9,82 \frac{\text{m}}{\text{s}^2} = 279,87 \text{ N}$$

$$\underline{\underline{F_{g \max} = 0,28 \text{ kN}}}$$

$$b) \sum F_x = 0 \quad F - F_g = 0$$

$$\leftarrow F_g = F = \underline{\underline{0,20 \text{ kN}}}$$

LIGGER STILLE FORDI F ER mindre enn $F_{g \max}$

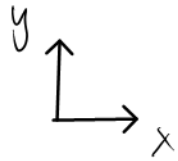
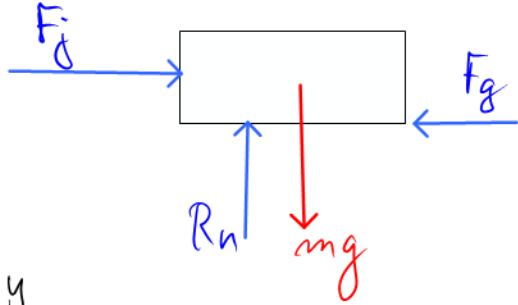
$$c) \max_x = \sum_{\text{alle}} F_x$$

$$a_x = \frac{1}{m} \sum F_x = \frac{1}{m} (F - F_{g \max})$$
$$= \frac{1}{95 \text{ kg}} (0,40 \cdot 10^3 \text{ N} - 279,87 \text{ N}) = 1,265 \frac{\text{m}}{\text{s}^2}$$

$$\underline{\underline{\rightarrow a = 1,3 \frac{\text{m}}{\text{s}^2}}}$$

OPG 5/6

a/



$$a) \uparrow \sum F_y = 0 : R_n - mg = 0 \rightarrow F_s = k \Delta L = 0,40 \cdot 10^3 \cdot 0,30$$

$$R_n = mg \quad F_s = 120 \text{ N}$$

$$F_g = \mu R_n$$

$$a_x = \frac{F_s - F_g}{m} = \frac{k \cdot \Delta L - \mu \cdot m \cdot g}{m}$$

$$a_x = \frac{0,40 \cdot 10^3 \cdot 0,30 - 0,30 \cdot 50 \cdot 9,82}{5,0} = 21,05 \frac{\text{m}}{\text{s}^2}$$

$$\Rightarrow \underline{\underline{a = 21 \frac{\text{m}}{\text{s}^2}}}$$

b) FRI AF FJEDER

$$m a_x = \sum_{\text{alle}} F_x$$

$$a_x = \frac{\sum F_x}{m} = \frac{-F_g}{m} = \frac{-0,30 \cdot 50 \cdot 9,82}{5,0}$$

$$= -2,946 \frac{\text{m}}{\text{s}^2}$$

$$\underline{\underline{\leftarrow a = 2,9 \frac{\text{m}}{\text{s}^2} \text{ (BREMSER)}}}$$

b/

