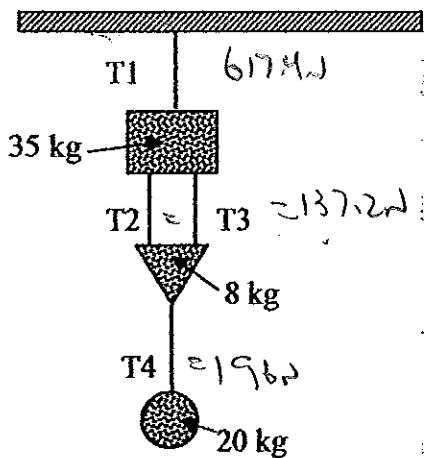


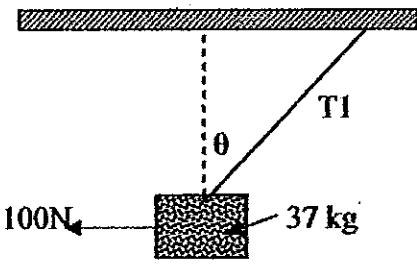
Fr

Force diagrams in equilibrium  
All objects are in equilibrium unless otherwise specified

1. Find T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>.



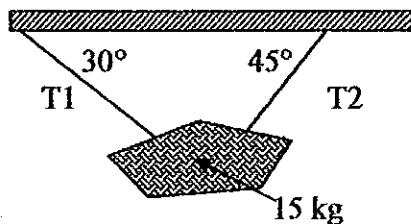
5. Find the angle and T<sub>1</sub>.



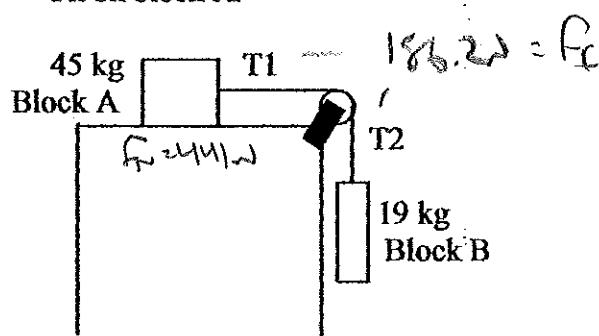
$$T_1 = 376.4$$

$$\theta = 15.4^\circ$$

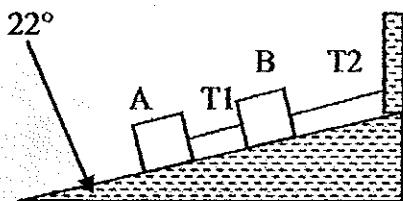
2. Find T<sub>1</sub> and T<sub>2</sub>



3. The blocks are moving at a constant velocity. Find T<sub>1</sub>, T<sub>2</sub>, F<sub>f</sub> on block A and F<sub>n</sub> on block A.



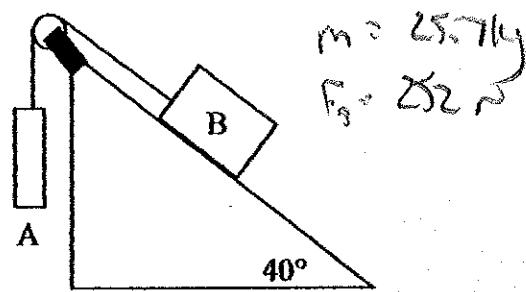
4. There is no friction. Find T<sub>1</sub> and T<sub>2</sub>.  
 Block A = 7 kg Block B = 30 kg



$$T_1 = 25.7 \text{ N}$$

$$T_2 = 135.8 \text{ N}$$

6. There is no friction. The mass of block B is 40 kg. Find the mass and weight of block A. System is at rest.

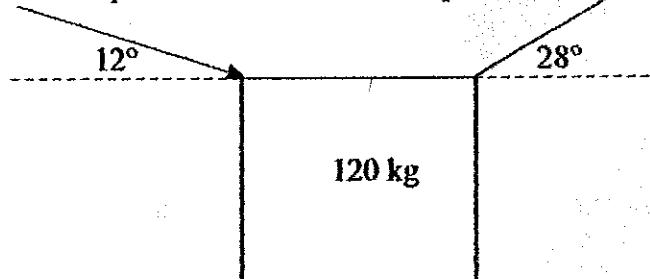


7. The block is moving at a constant velocity.

Find F<sub>f</sub> and F<sub>n</sub>.

$$F_{\text{push}} = 175 \text{ N}$$

$$F_{\text{pull}} = 300 \text{ N}$$



$$F_f = 436.1 \text{ N}$$

$$F_n = 1072 \text{ N}$$

(1)

Answer = unit IV = Run  $1^{\circ} \times 3^{\circ}$

1.

A

$$\begin{cases} T_1 \\ T_2 \\ T_3 \end{cases}$$

B

$$\begin{cases} T_1 \\ T_2 \\ T_3 \\ T_4 \end{cases}$$

C

$$\begin{cases} T_1 \\ T_2 \\ T_3 \\ T_4 \end{cases}$$

$$T_1 = F_{x_1} + F_{x_2} + T_3$$

$$T_3 = 343 + 274.4$$

$$\underline{T_1 = 617.4 \text{ N}}$$

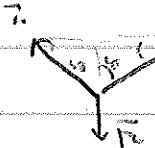
$$T_2 + T_3 = F_{x_3} + T_4$$

$$T_2 + T_3 = 274.4$$

$$\underline{T_2 = T_3 = 137.2 \text{ N}}$$

$$\underline{T_4 = 196 \text{ N}}$$

2.



$$T_1 \quad T_2$$

$$T_1 \sin 60^\circ = T_2 \sin 45^\circ$$

$$T_1 = 1.118 T_2$$

$$T_{1y} + T_{2y} = F_x$$

$$T_1 \cos 60^\circ + T_2 \cos 45^\circ = 147 \text{ N}$$

$$1.118 T_2 \cos 60^\circ + T_2 \cos 45^\circ = 147 \text{ N}$$

$$1.408 T_2 \cos 60^\circ + 0.707 T_2 = 147 \text{ N}$$

$$1.118 T_2 = 147 \text{ N}$$

$$\underline{T_2 = 131.84 \text{ N}}$$

$$\underline{T_1 = 107.6 \text{ N}}$$

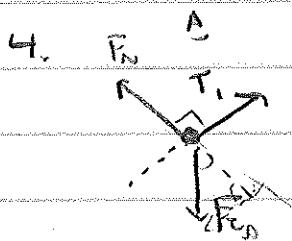
3.

$$\begin{cases} T_2 = T_1 = 131.84 \text{ N} \\ F_{x_3} = 131.84 \text{ N} \end{cases}$$

$$\underline{F_7 = 131.84 \text{ N}}$$

$$F_y = F_{x_3} = (.45)(131.84) = \underline{441 \text{ N}}$$

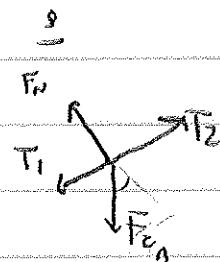
(2)

Ansvars Vektorer med 1<sup>o</sup> & 30<sup>o</sup> bæn

$$T_1 = \bar{F}_{E_A} \sin 22^\circ$$

$$(7)(9.8) \sin 22^\circ$$

$$\boxed{T_1 = 25.7 \text{ N}}$$

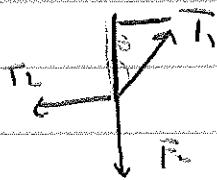


$$T_2 = T_1 + \bar{F}_{E_B} \sin 22^\circ$$

$$T_2 = 25.7 \text{ N} + (30)(9.8) \sin 22^\circ$$

$$\boxed{T_2 = 135.8 \text{ N}}$$

5.



$$\bar{F}_E = T_1 \cos \theta$$

$$(30)(9.8) \cos 38.6^\circ = T_{1x}$$

$$T_{1x} = 100 \text{ N}$$

$$T_{1y} = 362.6 \text{ N}$$

$$\bar{T}_2 = T_1 \sin \theta$$

$$100 = T_1 \sin \theta = T_{1y}$$

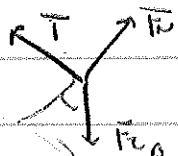
$$\boxed{T_1 = -376.14 \text{ N}}$$

$$\tan \theta = \frac{T_{1x}}{T_{1y}} = \tan \left( \frac{100}{362.6} \right)$$

$$\boxed{\theta = 15.4^\circ}$$

6. (Assume  $\mu_s$  Rør)

B



$$T = F_{E_B} \sin 40^\circ$$

$$= (40)(9.8) \sin 40^\circ$$

$$\boxed{T = 252 \text{ N}}$$

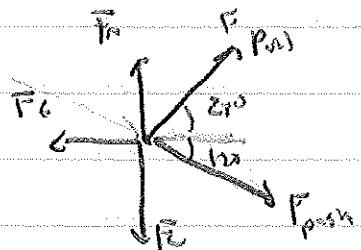
$$\therefore \bar{F}_{E_A} = 252 \text{ N}$$

$$m = 25.7 \text{ kg}$$

Ausser Wiss IV Raum Mechanik 1<sup>st</sup> SS<sup>th</sup> Law

(3)

7.



$$\vec{F}_G = (m \cdot g) (\cos \alpha) = 1176 \text{ N}$$

$$\vec{F}_{\text{phy}} = 300 \cos 28^\circ = 264.9 \text{ N}$$

$$F_{\text{phy}} = 300 \sin 28^\circ = 140.8 \text{ N}$$

$$F_{\text{fr}} = 175 \sin 12^\circ = 171.2 \text{ N}$$

$$F_{\text{fr}, \text{max}} + F_{\text{phy}} = \vec{F}_G = 0$$

$$F_{\text{phy}} + \vec{F}_N = \vec{F}_{\text{fr}} = 0$$

$$F_{\text{fr}, \text{max}} + F_N = \vec{F}_G = 0$$

$$264.9 + 171.2 \text{ N} = F_G$$

$$436.1 \text{ N} \approx \vec{F}_G$$

$$F_{\text{fr}} = 36.8 \text{ N} \approx \vec{F}_{\text{fr}} = 0$$

$$140.8 + F_N = 36.8 \approx 1176 = 0$$

$$F_N = 1072 \text{ N}$$