Külling & Noverraz, Forces en équilibre
Corrigés

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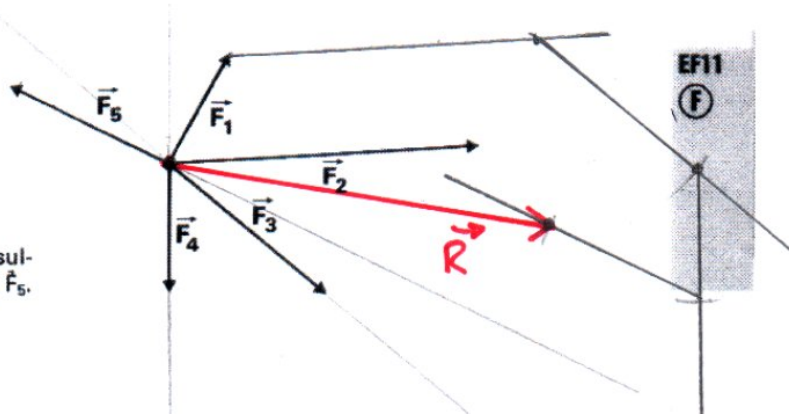
EF11 Ⓕ

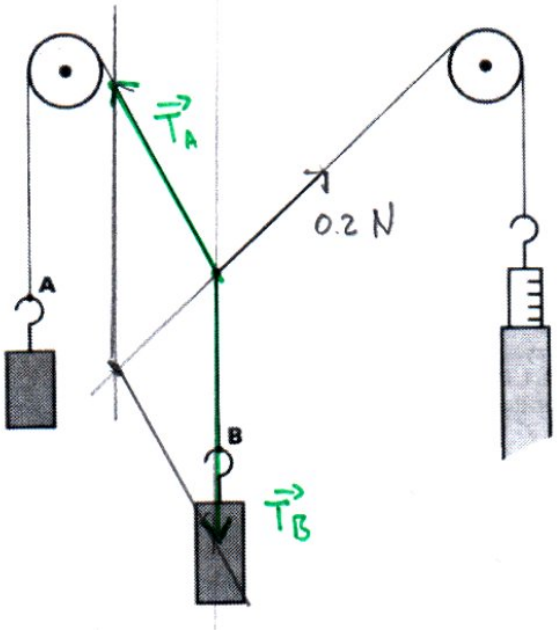
Déterminer graphiquement la résultante $\vec{R}$ des forces $\vec{F}_1$, $\vec{F}_2$, $\vec{F}_3$, $\vec{F}_4$ et $\vec{F}_5$.



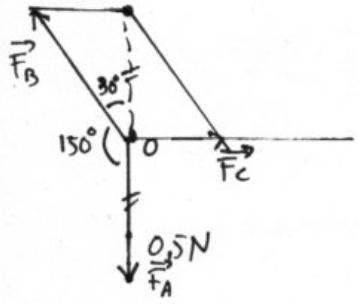
EF20 Ⓕ

Le système de la figure est en équilibre. L'intensité indiquée par le dynamomètre est égale à 0,20 N.
Déterminer graphiquement les intensités des forces de pesanteur des objets suspendus en A et en B.

	N	cm
	0.2	2.0
T_A	0.30	3.0
T_B	0.38	3.8



EF30

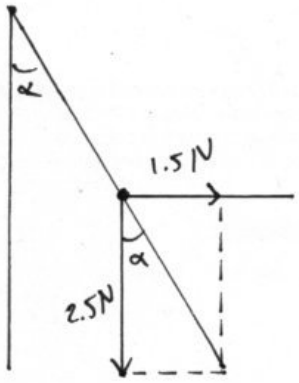


$T_A = 0.5\,N$

$\cos(30) = \frac{0.5}{T_B} \Rightarrow T_B = \frac{0.5}{\cos(30)} \simeq 0.58\,N$

$\tan(30) = \frac{T_C}{0.5} \Rightarrow T_C = \tan(30) \cdot 0.5 \simeq 0,29\,N$

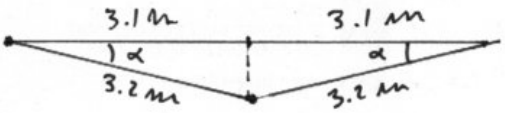
EF31



$\tan(\alpha) = \frac{1.5}{2.5} = 0.6$

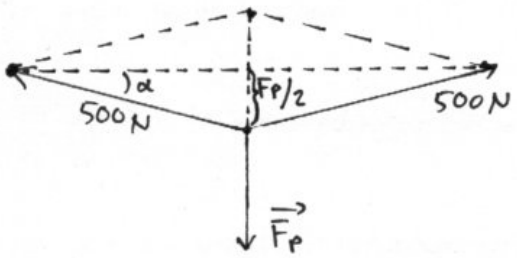
$\Rightarrow \alpha \simeq 31°$

EF32



$\cos(\alpha) = \frac{3.1}{3.2} = 0.969$

$\Rightarrow \alpha = 14.36°$

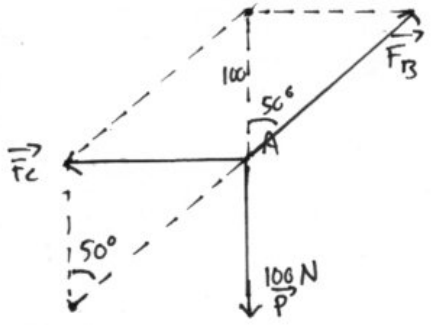


$\sin(\alpha) = \frac{\frac{F_p}{2}}{500} = \frac{F_p}{1000}$

$\Rightarrow F_p = \sin(14.36) \cdot 1000 \simeq 248\,N$

$\Rightarrow m \simeq 24.8\,kg$

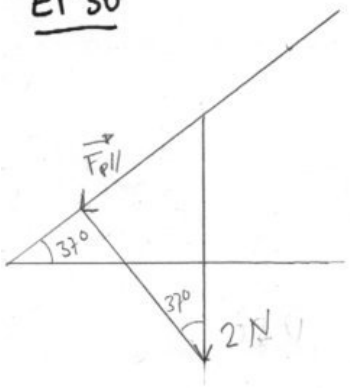
EF33



$\tan(50) = \frac{F_C}{100} \Rightarrow F_C = 100 \cdot \tan(50)$
$\approx 119.2\ N$

$\cos(50) = \frac{100}{F_B} \Rightarrow F_B = \frac{100}{\cos(50)} = 155,6\ N$

EF36



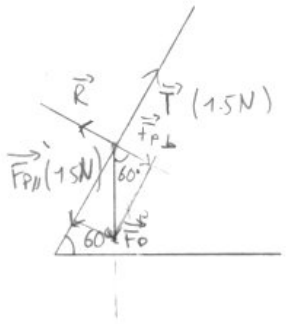
$P_{m_2} = F_{P//}$

$\sin(37°) = \frac{F_{P//}}{2} \Rightarrow F_{P//} =$

$2 \cdot \sin(37°) = 1.20\ N$

$\Rightarrow m_2 = 120\ g$

EF37

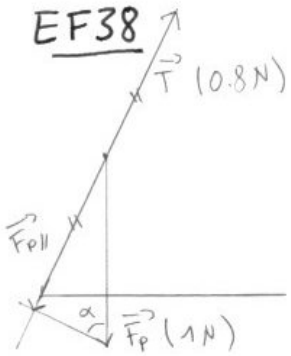


$F_{P//} = T = P_m = 0.15 \cdot 10 = 1.5\ N$

$\tan(60°) = \frac{F_{P//}}{F_{P\perp}} \Rightarrow F_{P\perp} = \frac{F_{P//}}{\tan(60)} = \frac{1.5}{\tan(60)}$

$= 0.866\ N = R$

EF38

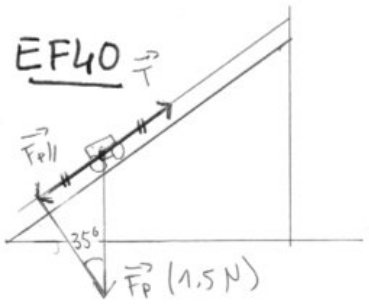


$F_{p//} = T = 0.8\,N$

$\sin(\alpha) = \frac{F_{p//}}{F_p} = \frac{0.8}{1} = 0.8$

$\Rightarrow \alpha \simeq 53.1°$

EF40

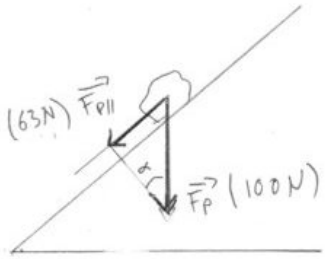


$T = F_{p//}$

$\sin(35°) = \frac{F_{p//}}{F_p} \Rightarrow F_{p//} = F_p \cdot \sin(35°)$

$= 1.5 \cdot \sin(35°) = 0,86\,N$

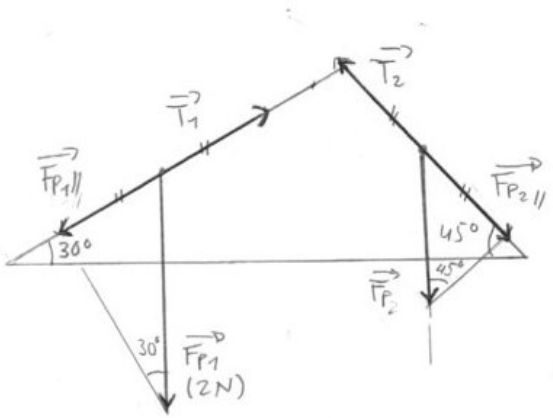
EF41



$\sin(\alpha) = \frac{F_{p//}}{F_p} = \frac{63}{100} = 0.63$

$\Rightarrow \alpha = 39°$

EF43



$$\sin(30) = \frac{F_{P1//}}{F_{P1}} \Rightarrow$$

$$F_{P1//} = \sin(30) \cdot 2 = 1\,N$$

$$F_{P1//} = T_1 = T_2 = F_{P2//}$$

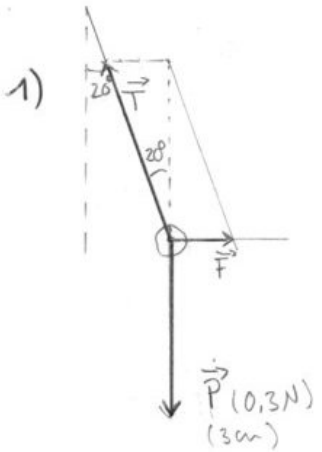
$$\sin(45) = \frac{F_{P2//}}{F_{P2}} \Rightarrow F_{P2} = \frac{F_{P2//}}{\sin(45)}$$

$$= \frac{1}{\sin(45)} = 1.41\,N$$

$$\Rightarrow m_2 = \underline{\underline{141\,g}}$$

EF46

1)



2) $P = 0.3\,N$

$$\tan(20) = \frac{F}{P} \Rightarrow F = P \cdot \tan(20)$$

$$= 0.3 \cdot \tan(20) = \underline{\underline{0.109\,N}}$$

$$\cos(20) = \frac{P}{T} \Rightarrow T = \frac{P}{\cos(20)} = \frac{0,3}{\cos(20)}$$

$$= \underline{\underline{0,319\,N}}$$