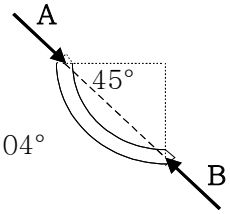
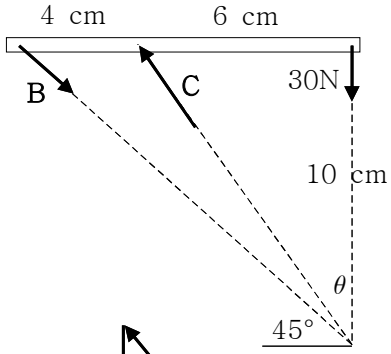
<4.6~4.7절>

4.65 [세 힘이 작용하는 강체의 평형, 세 힘의 작용선이 한 점에서 만남]





$\tan\theta = \frac{6\text{ cm}}{10\text{ cm}} = 0.60$

$\Rightarrow \quad \theta = \tan{-1}(0.60) = 30.96°$

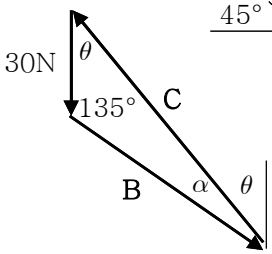
$\alpha = 45° - \theta = 45° - 30.96° = 14.04°$

sine 공식 $\quad \frac{\sin\alpha}{130\text{ N}} = \frac{\sin\theta}{B} = \frac{\sin 135^\circ}{C}$

$\frac{\sin\alpha}{130\text{ N}} = \frac{\sin\theta}{B}$

$\Rightarrow \quad B = \frac{\sin\theta}{\sin\alpha}(30\text{ N}) = \frac{\sin 30.96^\circ}{\sin 14.04^\circ}(30\text{ N})$

$= 63.62\text{ N}$



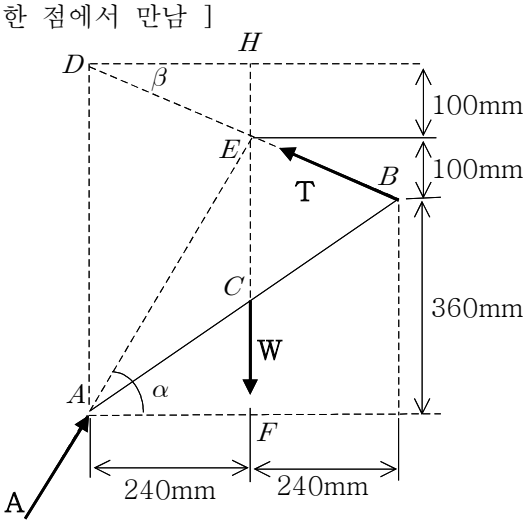
$A = B = 63.62\text{ N} \qquad \Rightarrow \qquad \mathbf{A} = 63.6\text{ N} \searrow 45°$

$\frac{\sin\alpha}{130\text{ N}} = \frac{\sin 135^\circ}{C}$

$\Rightarrow \quad C = \frac{\sin 135^\circ}{\sin\alpha}(30\text{ N}) = \frac{\sin 135^\circ}{\sin 14.04^\circ}(30\text{ N}) = 87.44\text{ N}$

$45° + 14.04° = 59.04° \qquad \Rightarrow \qquad \mathbf{C} = 87.4\text{ N} \nwarrow 59.0°$

4.72 [세 힘이 작용하는 강체의 평형, 세 힘의 작용선이 한 점에서 만남]



$W = 200\text{ N}$

$\tan\alpha = \frac{EF}{AF} = \frac{460\text{ mm}}{240\text{ mm}} = \frac{23}{12} = 1.917$

$\Rightarrow \quad \alpha = \tan^{-1}(1.917) = 62.45°$

$\tan\beta = \frac{EH}{DH} = \frac{100\text{ mm}}{240\text{ mm}} = \frac{5}{12} = 0.417$

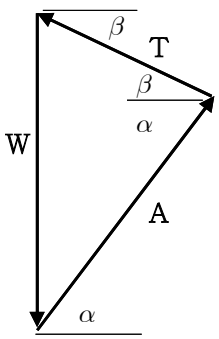
$\Rightarrow \quad \beta = \tan^{-1}(0.417) = 22.62°$

$\frac{A}{\sin(90^\circ-\beta)} = \frac{T}{\sin(90^\circ-\alpha)} = \frac{W}{\sin(\alpha+\beta)}$

$A = W\frac{\sin(90^\circ-\beta)}{\sin(\alpha+\beta)}$

$= (200\text{ N})\frac{\sin(90^\circ-22.62^\circ)}{\sin(62.45^\circ+22.62^\circ)} = 185.3\text{ N}$

$\Rightarrow \quad \mathbf{A} = 185.3\text{ N} \nearrow 62.4°$



$T = W\frac{\sin(90^\circ-\alpha)}{\sin(\alpha+\beta)}$

$= (200\text{ N})\frac{\sin(90^\circ-62.45^\circ)}{\sin(62.45^\circ+22.62^\circ)} = 92.8\text{ N}$