Devoir #2 – 1505

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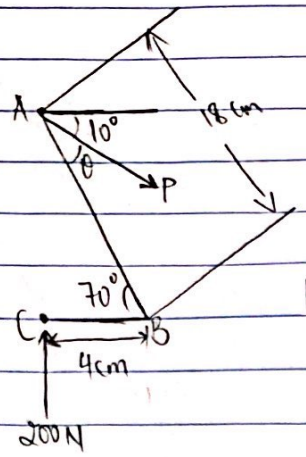
① 2.5/3



a) $M_B = F d_{AB} \sin\theta$

$= (200)(4)$

$M_B = 800\ N.cm$ direction? -0.5

b) $\alpha + \theta = 70°$

$10° + \theta = 70°$

$\theta = 60°$

$M_B = d_{AB} \times P \sin\theta$

$800 = (18) P \sin(60°)$

$P = \dfrac{800}{18 \sin 60°} = 51.32\ N$ ✓

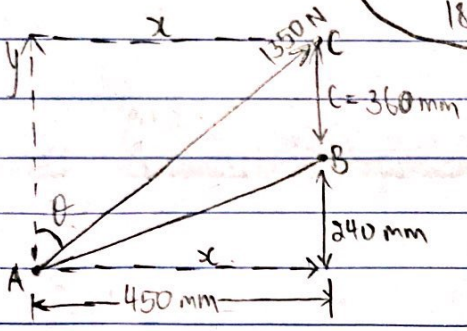
c) La force sera minimale si la force est perpendiculaire à la ligne joignant les points A et B

$M_B = d_{AB}\ P_{min}$

$800 = 18\ (P_{min})$ ✓

$P_{min} = 44.44\ N$

② 3/3



$\tan\theta = \dfrac{450}{240 + C}$ ou $C = 360$ mm

$\tan\theta = \dfrac{450}{600}$

$\theta = \tan^{-1}\left(\dfrac{450}{600}\right)$

⊛ $\theta = 36.87°$

$y = 1350 \cos\theta$

$y = 1350 \cos(36.87)$

$y = 1080.0\ N$

$x = 1350 \sin(36.87)$

$x = 810.0\ N$

2 tre ✓

Le moment par rapport à B:

$M_B = Fd$

$= [(y)(d_1)] - [(x)(d_2)]$

$= [1080 \times 450] - [810 \times 240]$

$= (486\ 000) - (194\ 400)$

$M_B = 291\ 600\ N.mm\ (291.6\ Nm)$ ✓

(3)

$$\vec{F}_{BD} = \vec{T}_{BD}\left[\frac{DF\,i - BC\,j + FC\,k}{\sqrt{(DF)^2 + (BC)^2 + (FC)^2}}\right]$$

$\vec{T}_{BD} = 900\,N$, $DF = -1m$, $BC = -2m$, $FC = 2m$

$$F_{BD} = 900\left[\frac{-1i - 2j + 2k}{\sqrt{(-1)^2 + (-2)^2 + (2)^2}}\right]$$

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$$F_{BD} = (-300\,i - 600j + 600k)\ N$$

Vecteur de position du point B d'origine O :

$$r_{OB} = (2.5i + 2j)\,m$$

$$M = r_{OB} \times F_{BD}$$

$$= \begin{vmatrix} i & j & k \\ 2.5 & 2 & 0 \\ -300 & -600 & 600 \end{vmatrix}$$

$$= \left[(1200 - 0)i - (1500 - 0)j + (-1500 + 600)k\right] N.m$$

$$M = (1200\,i - 1500\,j - 900\,k)\ N.m \quad (\text{le moment par rapport au point O})$$