

6/33 mass of crate = 900 kg

Rope at C is cut. FIND tension in cable at A in instant IMMEDIATELY AFTER. SOLVE using 3 EQNS, and using JUST 1.

$\theta = 60^\circ$



JUST AFTER ROPE CUT, CRATE IS STILL AT REST.

$\Rightarrow \omega = 0$ so $r\omega^2$ component

of acceleration is zero

$\Rightarrow a = r\ddot{\theta}$ and is tangential to path of travel. (as shown in green)

Use components n, t (normal, tangential)

$\sum F_n = ma_n = 0 = r\omega^2$

$\Rightarrow T_A + T_B - W_n = 0$

OR $T_A + T_B = mg \cos(30^\circ)$ *

$\sum F_t = ma_t$

$\Rightarrow W_t = ma_t \Rightarrow a = \frac{mg \sin(30^\circ)}{m} = \frac{g}{2} \text{ ms}^{-2}$

$\sum M_G = 0$

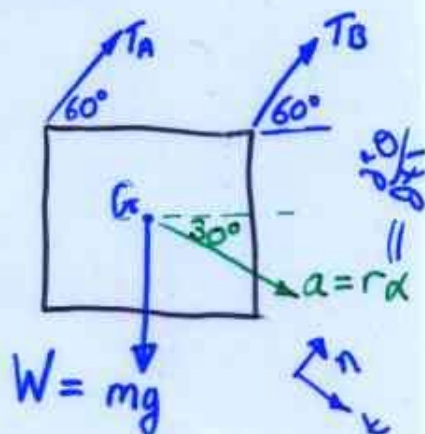
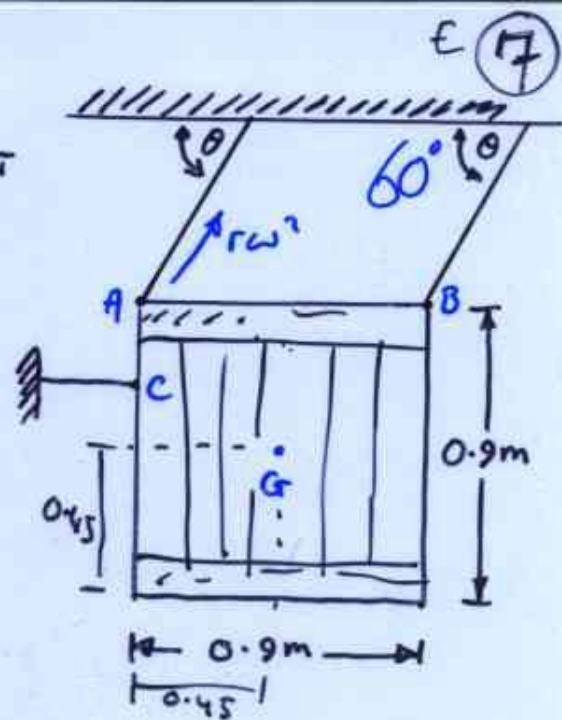
$\Rightarrow T_B \left[\frac{0.9}{\sqrt{2}} \sin(15^\circ) \right] - \left[T_A \left(\frac{0.9}{\sqrt{2}} \right) \cos(15^\circ) \right] = 0$

$\Rightarrow T_B = 3.7273 T_A$

Substitute into 1st Expression *

$T_A + 3.7273 T_A = (900)(9.81)(\cos 30^\circ)$

$\Rightarrow T_A = 1617 \text{ N}$



$a_n = 0$
 $\Rightarrow a = a_t$

\vec{W} has no moment about G