

6735 mass of crate = 900kg

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)

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

$$\Rightarrow T_A + T_B - W_n = 0$$

$$\text{OR } \underline{T_A + T_B} = mg \cos(30^\circ) \quad (*)$$

$$\left[\sum F_t = ma_t \right]$$

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

$$\sum M_G = 0$$

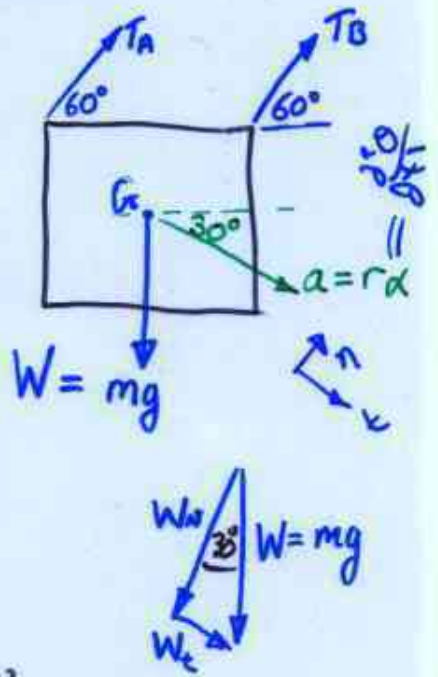
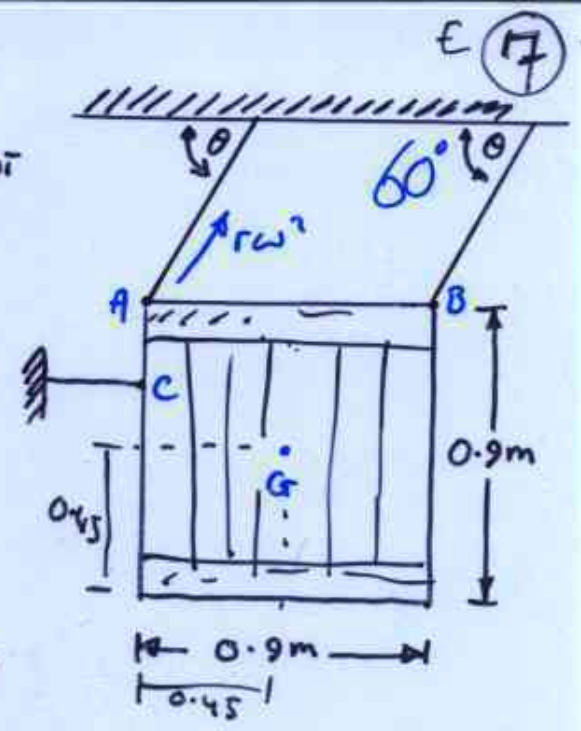
$$\Rightarrow T_B \left[\frac{0.9}{\sqrt{2}} \sin(15^\circ) \right] - \left[T_A \left(\frac{0.9}{\sqrt{2}} \right) \cos(15^\circ) \right] = 0$$

$$\Rightarrow T_B = 3.7273 T_A$$

Substitute into 1st Expression (*)

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

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



$$a_n = 0$$

$$\Rightarrow a = a_t$$

\vec{W} has no moment about G