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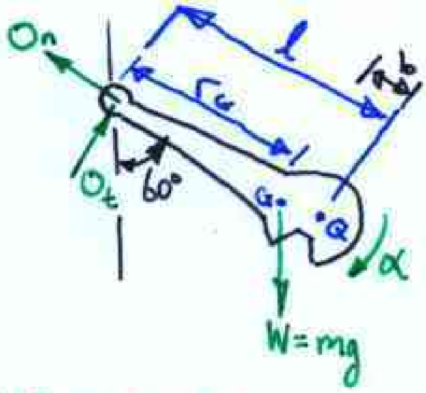
F5

at moment of release
find O_t, O_N & $\|\vec{O}\|$
since it is just released $\Rightarrow \omega = 0$



$$\sum F_N = ma_n$$

$$O_N - mg\cos 60° = mr\omega^2 = 0$$ because $\omega = 0$ because just been released.

$$\Rightarrow O_N = mg\cos(60°)$$
$$= (34)(9.81)(0.5)$$
$$\boxed{O_N = 166.77\,N}$$

$$\sum M_o = I_o\alpha$$
$$\Rightarrow (mg\sin 60°)r_G = mk_o^2\alpha$$
$$\Rightarrow \alpha = \frac{(34)(9.81)(0.866)(0.6)}{(34)(0.620)^2} = 13.26 \text{ rad s}^{-2}$$

$$\sum F_t = ma_{G_t}$$
$$\Rightarrow O_t - mg\sin 60° = -mr_G\alpha$$
$$\boxed{O_t} = (34)(9.81)(0.866) - (34)(0.6)(13.26) = \boxed{18.35\,N}$$

$$\therefore \|O\| = \sqrt{(18.35)^2 + (166.77)^2} = \underline{167.8\,N} \approx O_N$$

Note we could have used centre of percussion

$$\sum M_Q = 0 \quad \text{Prop of c. of. percussion}$$
$$\Rightarrow mg(\sin 60°)b - O_t\,l = 0 \;;\; l = 0.6407 \quad b = 0.0407$$
$$O_t = \frac{mgb\sin 60°}{l} = \frac{(34)(9.81)(0.0407)(0.866)}{0.6407}$$
$$\boxed{O_t = 18.35\,N} \quad \text{again}$$