Applying ...

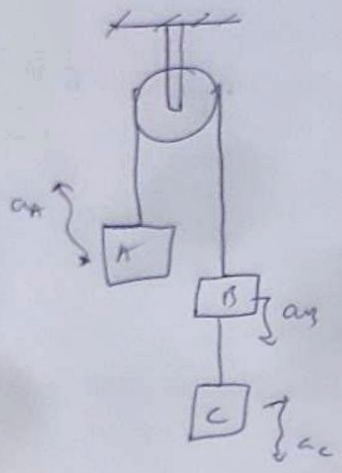
$$\sum_{i=1}^{2} T_{sys\,i} \cdot a_{sys\,i} \cos\theta_i = 0$$

$\Rightarrow -6T a_1 + T a_2 = 0$ [Since $\cos 180° = -1$, $\cos 0° = 1$]

$\Rightarrow \boxed{6a_1 = a_2}$

(Method)

(5) Three equal weights of mass 2kg each are hanging on a string over a fixed pulley as shown. Tension in the string connecting B & C?



Concepts Used :-

(1) Constraint Relation

(2) FBD

Formula Used

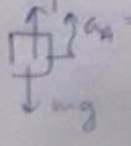
(1) $\vec{F}_{net} = m\vec{a}_{net}$

(2) Pseudo trick.

By above theorem

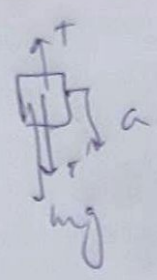
$\boxed{a_A = a_B - a_C}$

For A



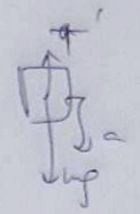
$T - mg = ma$.

(B)



$mg + T' - T = ma.$

(C)



$mg - T' = ma.$

Adding all the equation :

$$3mg = ma \Rightarrow \boxed{a = \frac{g}{3}}$$

Substituting in the last eqⁿ

$$\Rightarrow mg - T' = mg/3$$

$$\Rightarrow T' = \frac{2mg}{3} = \frac{40}{3} \approx 13.3N.$$