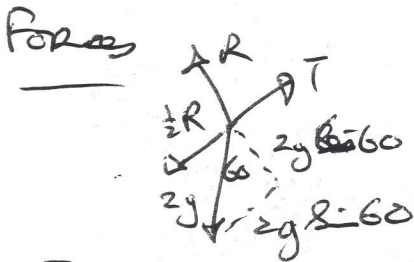


1977 Q4 A B

Mass (A) 2kg

Accel $\frac{a}{\sqrt{3}}$



NI I:

⊥ plane $a=0$ } || plane

$$R - 2g \cos 60 = 0 \quad T - \frac{1}{2}R - 2g \sin 60 = 2a$$

$$R - g = 0 \quad T - \frac{1}{2}g - 2g \frac{\sqrt{3}}{2} = 2a$$

$$\boxed{R = g} \quad T - \frac{g}{2} - \sqrt{3}g = 2a$$

(1) (2)

Find a (1) $\Rightarrow T - \frac{g}{2} - \sqrt{3}g = 2a$

(3) $\Rightarrow 5g - T = 5a$

$5g - \frac{g}{2} - \sqrt{3}g = 7a$

$\Rightarrow 2.7674g = 7a$

$\boxed{3.875 \text{ ms}^{-2} = a}$

LAST PART For A not to move

we must pick a mass x such that $\boxed{\text{accel}, a=0}$

A ⊥ plane: } A || plane

$$R - xg \left(\frac{1}{2}\right) = 0 \quad T - \frac{1}{2}\left(\frac{xg}{2}\right) - xg \frac{\sqrt{3}}{2} = 0 \quad 5g - T = 0$$

$$\boxed{R = \frac{xg}{2}}$$

$\therefore T - \frac{xg}{4} - \frac{xg\sqrt{3}}{2} = 0$ and $T = 5g$

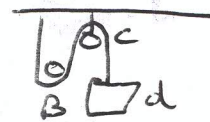
$\Rightarrow 5g - \frac{xg}{4} - \frac{xg\sqrt{3}}{2} = 0$

$\Rightarrow 20 - x - 2x\sqrt{3} = 0$

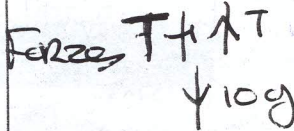
$\Rightarrow 20 = x(1 + 2\sqrt{3})$

$\Rightarrow \boxed{20} = x$ || ||

1973 Q4



(B) Mass 10
Accel $\uparrow a$



NI I: $2T - 10g = 10a$

$\boxed{T - 5g = 5a}$

(1)

$10g - T = 10(2a)$

$\boxed{10g - T = 20a}$

(2)

(1) + (2) $\Rightarrow 5g = 25a$

$\Rightarrow a = \frac{1}{5}g \text{ ms}^{-2}$

Accel (B) = $\frac{1}{5}g \text{ ms}^{-2}$

Accel (D) = $2\left(\frac{1}{5}g\right) = \frac{2}{5}g \text{ ms}^{-2}$

Find T:

$10g - T = 20a$

$\Rightarrow 10g - T = 20\left(\frac{1}{5}g\right)$

$\Rightarrow 10g - T = 4g$
 $-T = -6g$

$T = 6g \text{ N}$

Note Let dist gone by B in second be $x \text{ m}$.

\Rightarrow Distance gone by D in 1 sec

is $2x \text{ m}$

\Rightarrow distances in ratio 1:2

\Rightarrow accel in ratio 1:2

Accel B = a

\Rightarrow Accel D = $2a$