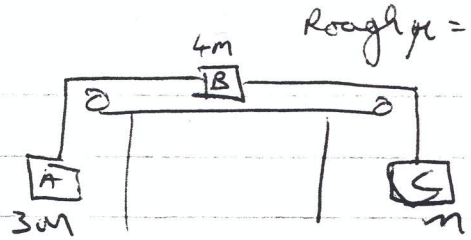
1975 Q3



	(A)	(B)	(C)
Mass	$3m$	$4m$	m
accel	$\downarrow a$	$\leftarrow a$	$\uparrow a$
forces	$\uparrow T$, $\downarrow 3mg$	$\uparrow R$, S, $\rightarrow T$, $\leftarrow \frac{1}{3}R$, $\downarrow 4mg$	$\uparrow S$, $\downarrow mg$

NII: $3mg - T = 3ma$

(B) $\perp$ to table: $R - 4mg = 0$, $R = 4mg$

(B) // to table: $T - S - \frac{1}{3}R = 4ma$, $T - S - \frac{4}{3}mg = 4ma$

(C): $S - mg = ma$.

To find distance fallen first find acceleration a

(A) $\Rightarrow$ $3mg - T = 3ma$.

(B) $\Rightarrow$ $T - S - \frac{4}{3}mg = 4ma$

(C) $\Rightarrow$ $S - mg = ma$

$\frac{2}{3}mg = 8ma$. $\Rightarrow$ $\boxed{a = \frac{g}{12}\ ms^{-2}}$

$\Rightarrow$ distance fallen in time t.

$s = ut + \frac{1}{2}at^2$

$\rightarrow s = 0 + \frac{1}{2}\cdot\frac{g}{12}t^2$

$\boxed{s = \frac{g}{24}t^2}$ metres.